

Central Railroad of New Jersey: Engine
Terminal Complex
Jersey City
Hudson County
New Jersey

HAER No. NJ-27A

HAER,
NJ,
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PHOTOGRAPHS

HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D. C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

Central Railroad of New Jersey: Engine Terminal Complex

NJ-27A

Location: In Communipaw, Jersey City, Hudson County, New Jersey. The site is bounded on the north by the New Jersey Turnpike Extension, on the west by Communipaw Avenue, on the south by Phillips Drive, and on the east by Johnston Avenue.

UTM: Site occupies a generally rectangular area defined by the following points:

SW corner of site: 18.579570.4506360
NW corner of site: 18.579490.4506570
NE corner of site: 18.579800.4506660
SE corner of site: 18.579800.4506500

Quad: Jersey City
—

Date of Construction: 1914

Present Owner: State of New Jersey

Present Use: Abandoned

Significance: The terminal was part of the ongoing 19th and 20th-century development of the New Jersey side of New York Harbor by the railroad companies. At its building in 1914, it was the largest engine terminal in the United States. Architecturally, its construction used the new materials of reinforced concrete and steel to embrace the aesthetic of functionalism.

Historians: Herbert J. Githens and Edward S. Rutsch, October 1981

Transmitted by: Jean P. Yearby, 1984

INDUSTRIAL ARCHEOLOGICAL RECORDING OF THE
CENTRAL RAILROAD OF NEW JERSEY ENGINE TERMINAL
AT COMMUNIPAW, JERSEY CITY, HUDSON COUNTY, NEW JERSEY

by

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OCTOBER 1981

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I. INTRODUCTION

The engine terminal at Communipaw, Jersey City, of the Central Railroad of New Jersey is located at the southeast end of Communipaw Avenue at Phillips Drive. This location is just northeast of the toll-gates of the New Jersey Turnpike Hudson County Extension and west of the restored passenger terminal in Liberty State Park (see Figure 1). This significant industrial resource marked a major land use change within the old Dutch backwater community of Communipaw, Jersey City when it was built in 1914. Later, the Jersey City Sewerage Treatment (East) Plant was built adjacent to the terminal, removing the last vestiges of the old village.

In 1981, the engine terminal stands abandoned. The recent Aldene Plan for railroad consolidation rendered the facility obsolete after some 50 years of service. The New Jersey Turnpike Hudson County Extension--which when it literally cut through the north roundhouse left two surviving fragments--is an on-site reminder of the automobile age, which ultimately led to the demise of the railroads and their physical plants.

As environmental concern over the proper treatment and discharge of sewage has increased, the engine terminal site, located, as it is, adjacent to the sewage treatment plant, has been chosen to be utilized for secondary sewage treatment facilities. Land use pressures created



FIGURE-1. U.S.G.S. map, Jersey City Quadrangle, which includes the study area, here indicated by a circle. (Scale: 1:24,000.)

by the restrictions of Liberty State Park and the operating Conrail line on the old National Docks Railroad trackage make this site a logical choice. Years of attrition have taken their toll on the buildings and structures of the engine terminal at Communipaw. The concrete structural systems have suffered severe surface spalling, and the reinforcing steel, exposed to the elements, has deteriorated. Owing to these conditions and the need for an additional sewage treatment site, it was decided to demolish the engine terminal complex after an appropriate level of recording was completed.

The tasks accomplished in the following industrial archeological recording are in accordance with the New Jersey State Historic Preservation Officer's suggestion made in the Section 106: SHPO Consultation and Comments (36 CFR Part 800), p. 4, stating that "...it is recommended that there be a record made, by several appropriate methods, of those classes of remains and phenomena that have been in Rutsch and Githens 1980 [cultural resources survey] as having historical or cultural meaning."* The scope of services included documentary research, infield recording and analysis, and report formulation. This work was carried out during the summer of 1981 by the HCI team of Edward S. Rutsch and Herbert J. Githens, primary investigators, and Michael R. Spozarsky, photographer.

* The survey referred to is the Stage IB Cultural Resources Survey of the Hudson County Sewerage Authority's Proposed Sewerage Treatment Facilities at the Jersey City East Treatment Plant, Jersey City, Hudson County, New Jersey, by Edward S. Rutsch and Herbert J. Githens of Historic Conservation and Interpretation, Inc., in July of 1980. Research on the Jersey City and Bayonne harborside facilities has been an on-going activity of Rutsch and Githens since 1976.

A. DOCUMENTARY RESEARCH

Construction of the Jersey Central Engine Terminal at Communipaw was reported by the *Railway Age Gazette* on June 26, 1914, which included a plan (see Figure 8) and four photographs. Another plan (Figure 15) was illustrated in the April 9, 1915 *Railway Age Gazette* article that explained the reconstruction of the terminal yards. Various historic maps show the development of the complex at Communipaw. The Sanborn insurance maps provide the most information regarding construction, size, and usage of each building and/or structure (see Figure 9).

The photographic collection of the Central Railroad of New Jersey, which is now housed in the Jersey City Public Library, New Jersey Room, has provided a number of views of the complex in operation. These undated photographs show steam and diesel locomotives being directed into position at the terminal (Figures 11 through 14), as well as an overall distant view of the entire complex (Figure 18).

B. INFIELD RECORDING AND ANALYSIS

The engine terminal complex was examined to determine the most representative images which would best describe the ensemble as well as the individual buildings and structures. For overall views, two towers--one on the southeast side of Phillips Drive and the other situated between the two roundhouses--were used. The New Jersey Turnpike to the northwest also provided a similar perching position.

No attempt was made to alter the "as found" conditions. Vegetation overgrowth, debris, and vandalism were considered part of the 1981 record. Where safety permitted, interior views of the buildings were obtained.

Professional photographer and photoarchivist Michael R. Spozarsky was the project photographer. The large format work was carried out to the standards prescribed by the National Architectural and Engineering Record (NAER). Accompanying a copy of the final report, to be submitted to NAER, is a set of archive-quality negatives and two 8 x 10-inch archive quality prints of all photographic recording views. These have been developed, printed, and submitted in archival envelopes to NAER standards. These originals will eventually be placed with the Federal Archives, Library of Congress.

C. REPORT FORMULATION

The final report contains the results of tasks A and B. The analysis phase of this work included the historical development of this site from the early Dutch settlement to the present, with particular attention given to the change in cultural landscape features. A more in-depth analysis of the intervention of the Central Railroad of New Jersey on this site was conducted to understand better the standing remains of the engine terminal. This work included a study of the general development of the company and its specific facilities at Communipaw. Finally, and most important, is the record itself, which consists of 38 photographic documents and a narrative description of the

buildings and structures, including materials and methods of construction as well as the function or process that each structure performed. A bibliography of the sources cited in this manuscript is also included.

II. HISTORICAL OVERVIEW OF COMMUNIPAW

The following historical summary is provided to give the reader an historical perspective of the continuum of settlement that occurred in the project area, Communipaw.

A. FIRST BUILDINGS AT COMMUNIPAW, PAVONIA COLONY

The first settlement of the Colonial period in Communipaw dates to 1633 when the New Amsterdam Dutch established Pavonia after purchasing it in 1630 from the Indians. Two houses were built by order of the Dutch West India Company: the Jan Evertse Bout house at Communipaw and the Cornelius Van Vorst house at Ahasimus (*Bergen and Jersey City* 1910: 10). Bout's house is said to have been built in 1643 and Van Vorst's in 1636 (Winfield 1872: 44; 1874: 19; 1891: 10-11; Van Winkle 1902: 26-27). As of 1842, bouweries (farms) existed at Hoboken, Ahasimus, Paulus Hook, Jan de Lacher's Hook (north of Communipaw), Communipaw, and Caven Point (Winfield 1874: 31-34). This early period of discovery and growth was obliterated during the English occupation of New York by the Indian Wars and the "Pavonia Massacre," which retaliated for the massacres of the Indians (HCI 1977: 27).

B. ESTABLISHMENT OF PERMANENT SETTLEMENTS

Peter Stuyvesant required that new living places were to be protected by fortifications if the old Pavonia Colony was to be re-settled. The return of settlers began c. 1656 and resulted in the fortified settlement at Bergen (present-day Jersey City) in 1660 (Brett 1908: n.p.). Since Bergen was located northwest of Communipaw along the palisade ridge, the former bouwerie was revived as a transportation hub. The "road to Bergen" (present Communipaw Avenue to Summit Avenue) is one of New Jersey's oldest highways. At the foot of Communipaw Avenue along the bay, a ferry was established in 1661 as a point of access to New Amsterdam. This Communipaw Ferry operated until c. 1800 and was revived in altered form by the Central Railroad of New Jersey in 1864.

One description of Communipaw from the year 1660 comes from Jacques Cortelyu, who was ordered in that year to survey "Gemeonepa" (Communipaw) and to lay it out into village lots. The lots thus surveyed fronted on the bay, had a depth of about 200 feet, and extended from what is now Communipaw Avenue on the north to the Bay Shore House on the south (Shaw 1884: 939). This general description corresponds to the lands occupied by the Jersey City Sewerage Authority and the Jersey City car pound west of Phillips Drive.

Through the eighteenth century, Communipaw continued to provide ferry service and access to Bergen. Communipaw Cove provided oysters, and farming was another occupation. During the Revolution, the settlement was protected by American and British positions. The Communipaw Ferry, it would seem, succumbed to the more advantageously located Paulus

Hook Ferry, which was established in 1764 (HCI 1977: 61). Paulus Hook was included in the plans of the Associates of the Jersey Company, who envisioned a great city, Jersey City, based on plans drawn by Joseph Mangin (1804). As Jersey City grew, Communipaw became somewhat of a backwater.

C. NINETEENTH CENTURY

Industry located in the Paulus Hook area of Jersey City in the earliest decades of the nineteenth century. This growth, coupled with the arrival in Jersey City of the Paterson and Hudson River Railroad in 1834 (Lane 1939: 309-11) and the New Jersey Railroad and Transportation Company in 1835 (Cunningham 1966: 139), sealed the choice of Paulus Hook as Jersey City's centroid. Grand Street replaced the "road to Bergen" (Communipaw Avenue) as the principal east-west artery in Jersey City and, indeed, in the eastern seaboard as a whole.

Communipaw was not immediately involved when the railroads first arrived. Cutting openly through the Palisades around Journal Square, the railroad located its river terminal site near the end of Montgomery Street in Jersey City. The 1846 *Map of New York Bay & Harbor and the Environs* (C. & G.S. No. 37, sheet 5 of 6; see Figure 2) shows Communipaw located approximately midway along the South Cove between the highly developed Paulus Hook to the north and the remote Caven Point to the south. Houses are shown fronting the bay. Farmed plots are indicated along either side of Communipaw Avenue up to the Morris Canal near Grand Street and Summit Avenue (see Figure 2).

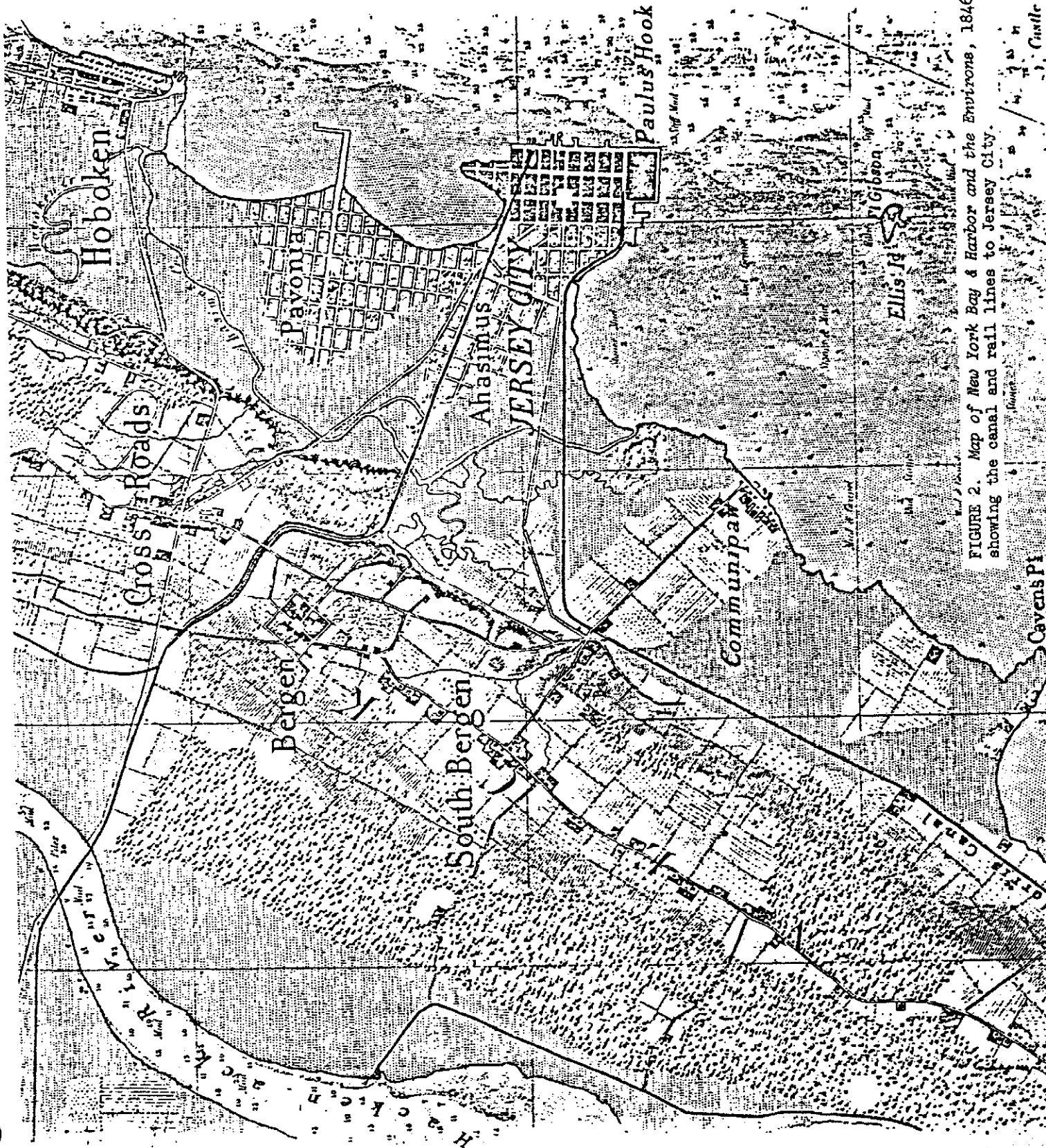


FIGURE 2. Map of New York Bay & Harbor and the Environs, 1846,
showing the canal and rail lines to Jersey City.

Washington Irving is said to have been entertained in the 1830s at the Van Horne home on Phillips Street in Communipaw (Brett 1908: n.p.). In an article believed to have been written by Irving and printed in *Staten Island Magazine* in 1888, Communipaw is described as follows:

Looking from Castle Garden, you observe from the Jersey margin of the bay, a group of low lying houses, on which the beams of the sun, or the shadows of a cloud rest with tranquility.
(*Staten Island Magazine* 1888: 100)

Regardless of the author's identity, the image here of Communipaw in the first half of the nineteenth century is one of "noisless ease and security, which has been undisturbed for ages" (*Staten Island Magazine* 1888: 101). Perhaps this visual dichotomy between industrialization at Paulus Hook and Manhattan on the one hand and the Dutch village of Communipaw on the other provided the point of departure for Irving's glib assertion that "Communipaw was the egg from which hatched the mighty city of New York" (Brett 1908: 11-12).

The wall mural entitled "Communipaw" by Ruth Wilcox, located in the main office of the Provident Institution for Savings on Washington Street in Jersey City, portrays Communipaw in 1830. This painting is similar to an illustration in Harriet Phillip Eaton's *Jersey City and Its Historic Sites* (Eaton 1899: 24; see Figure 3). Both views show Communipaw as a series of one and one-half to two and one-half-story houses fronting the bay, as shown in plan in the 1846 *Map of New York Bay & Harbor and the Environs* (Figure 2). The houses appear as mostly five-bay, center hall forms with end chimneys and gambrel or gable roofs, with an occasional spring eave porch. Greek Revival features appear on some of the houses in Eaton, but they seem "restored out" of the wall mural by Wilcox. The types of houses appearing in Communipaw during the



COMMUNIPAW.

FIGURE 3. Undated view of Communipaw shoreline, houses,
and piers, looking southwest (Eaton 1889: 24).

first half of the nineteenth century were generally the types built by the Dutch cultural groups in the New York metropolitan area and in abundance in Bergen County, New Jersey. The settlement depicted is still pre-industrial Communipaw, dominated by oyster fishing, some farming, and Georgian-Federal styled residences overlooking the bay.

D. THE RAILROADS

The major modification of Communipaw occurred in the 1860s, when the Central Railroad of New Jersey filled in the northern part of the South Cove to construct a passenger terminal. Gradually, into the twentieth century, the South Cove became entirely filled as the railroads, principally the Jersey Central, cut Communipaw off from the bay shoreline. This change in land use is documented by August Will, the nineteenth-century Jersey City artist, who painted two watercolors of the bay from the foot of Communipaw Avenue in 1861 and 1899 (see Figures 4 and 5; Sanford and McMahon 1976: 20-21). The later work shows the continuing filling operation of the railroads in the cove pressing southward and a rail line on pilings just east of Phillips Street.

The first Jersey Central passenger terminal was built in 1864 (*The Railroad Gazette* 1889: 422) and was replaced in 1889 by the still extant head house designed by Peabody and Stearns, Architects. Subsequent remodeling in 1914 yielded new train sheds, a train concourse, a ferry concourse, and ferry sheds. Although these facilities were remote from Communipaw itself, the support facilities, such as engine terminals, were constructed north of Communipaw Avenue. The main tracks leading to the passenger terminal followed the open cut west of old Communipaw, where

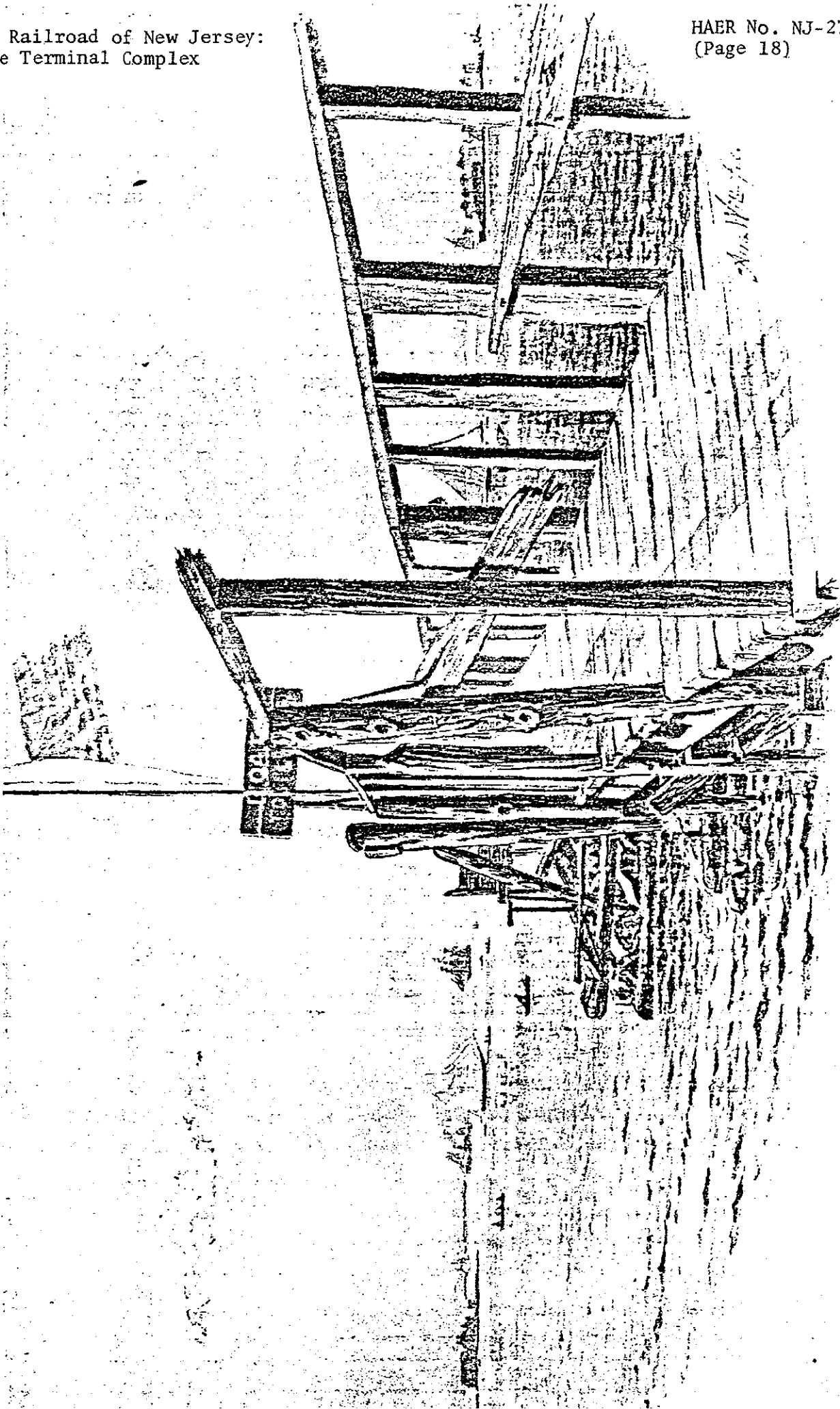


FIGURE 4. Source: *August Will* (Sanford and McMahon 1976: 20).

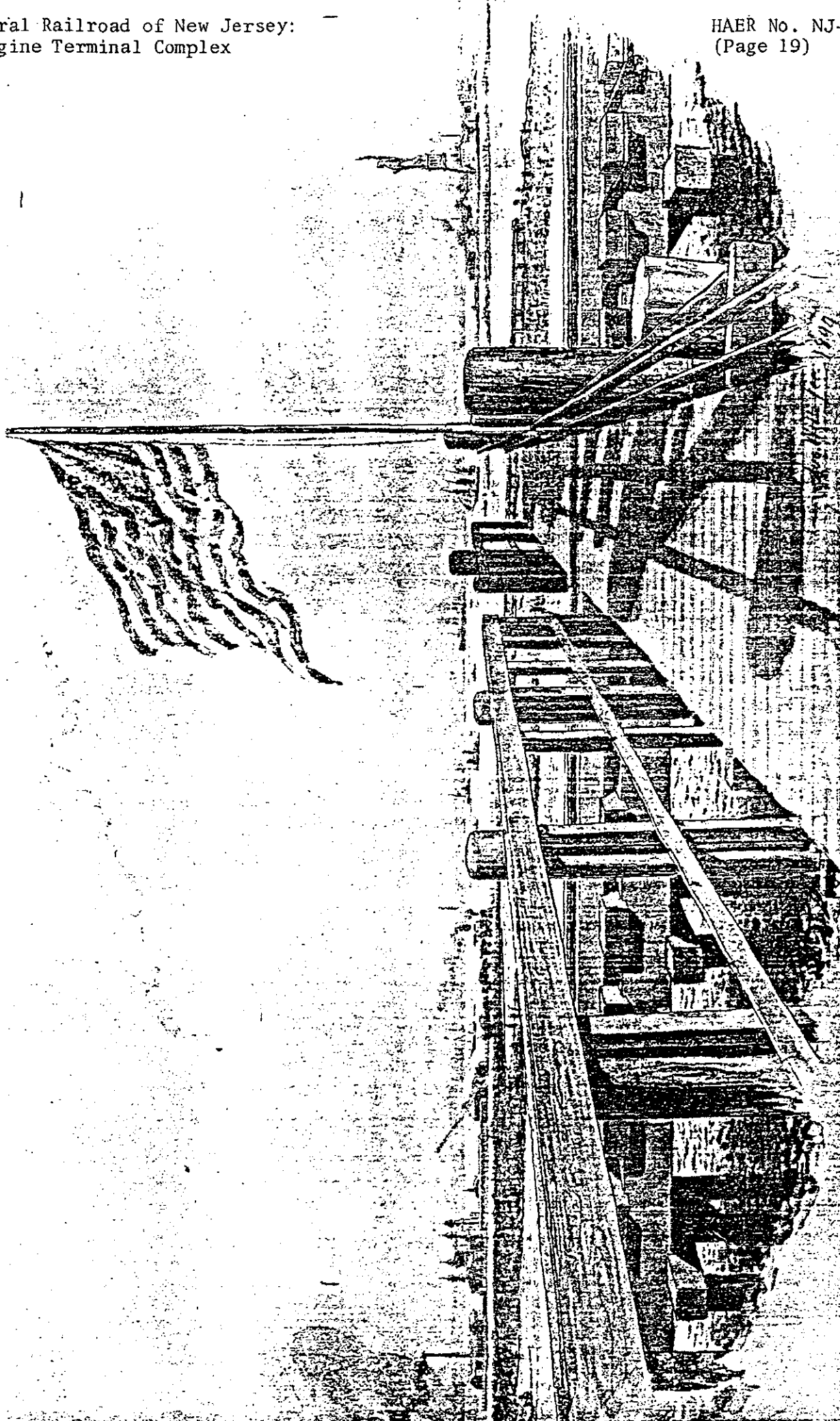


FIGURE 5. Source: *August Will* (Sanford and McMahon 1976: 21).

Pl. 6

BEDLOES AND ELLIS ISLANDS FROM COM
MUNIPAW AVENUE, 1899, watercolor.

the Parker truss bridge presently stands. In the nineteenth century this area was a grade crossing with Communipaw Avenue, and a small wood frame passenger station stood nearby (see Figure 6). The present bridge and station date from 1908.

To complement the passenger terminal, the Jersey Central built a large engine terminal in 1914 north of Communipaw Avenue and west of Phillips Street (*Railway Age Gazette* 1914A: 1585-87). These historic facilities included roundhouses, machine shops, coaling stations, a powerhouse, and offices. Major modifications of the north side of Communipaw Avenue occurred during this period. Between Wilson and Phillips streets the Jersey Central built a cast stone (concrete block) railroad restaurant at 230 Communipaw and a brick and concrete office building as well as a large railroad office and engineer's bunkhouse at 232 Communipaw, which has since been demolished (before 1981).

E. DECLINE

Although the railroads dominated the village on all sides, Communipaw survived into the twentieth century juxtaposed against the clutter of technology. Houses along Phillips Street and along the south side of Communipaw Avenue were still extant in 1910 when the Garret Bush House and Van Horne House (1804) were photographed in *Jersey City of To-Day: Its History, People, Trades, Commerce, Institutions & Industry* (Stevens 1910: 35). The 1908 Hopkins *Map Atlas of Hudson County, N.J.* shows the houses in place. As of 1928, Hopkins' *Plat Book of Hudson County, N.J.* (Jersey City maps) shows them gone. This demolition would predate the building of the east side Jersey City Sewerage Authority plant in 1957

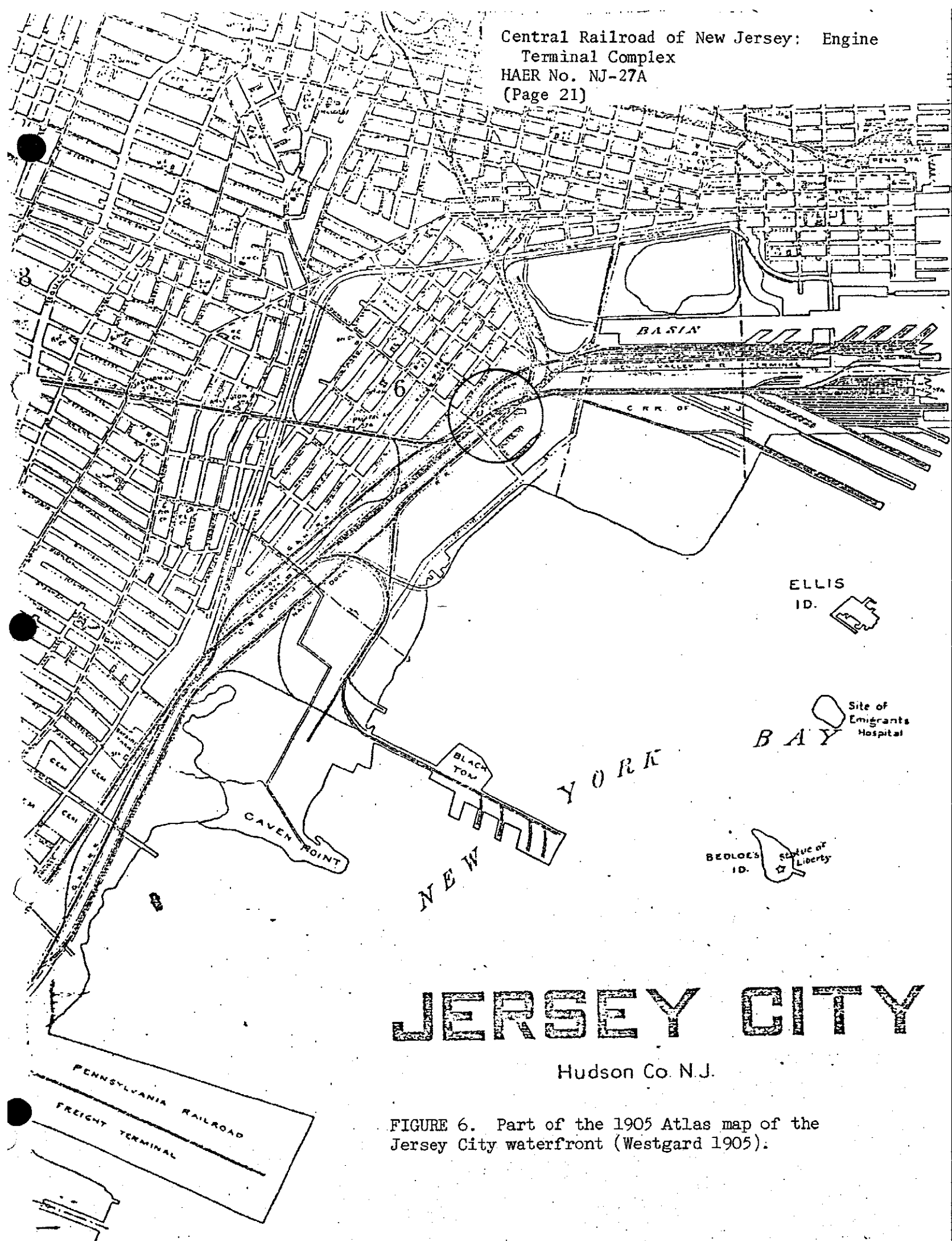


FIGURE 6. Part of the 1905 Atlas map of the Jersey City waterfront (Westgard 1905).

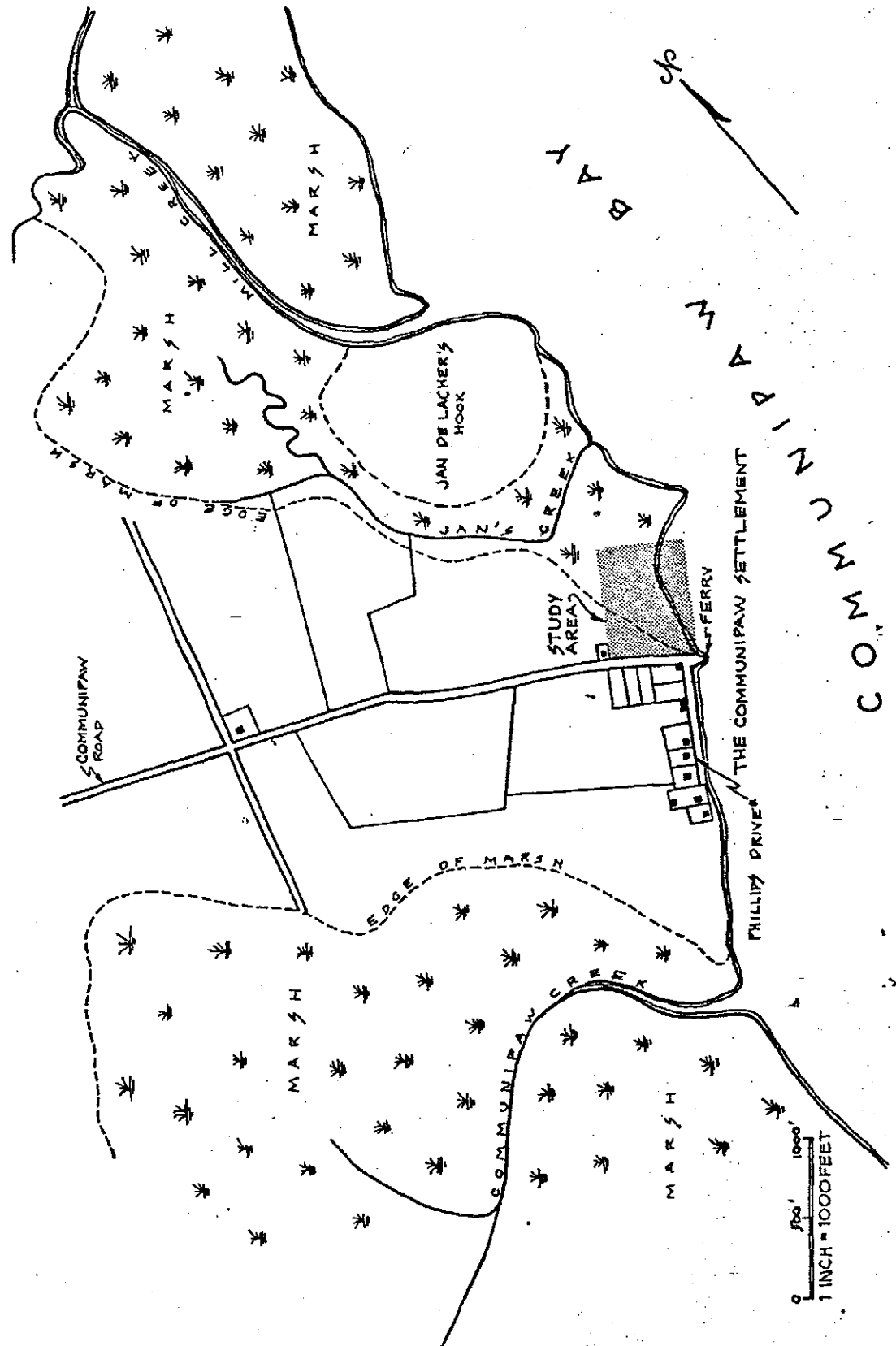
and the construction of the New Jersey Turnpike Hudson County Extension. These events, and the ultimate decline of the railroads, destroyed Communipaw as a residential entity. It survives today as waste treatment facilities, car pounds, and abandoned railroad buildings.

F. ANALYSIS OF PRE-RAILROAD STUDY AREA

Analysis of the historic documentation as well as of the previous infield reconnaissances (HCI 1977; Rutsch *et al.* 1978A and B; Rutsch and Githens 1980) has revealed that today's Communipaw Avenue at its junction with Phillips Drive is the harborside end of an original Dutch road connecting Bergen Hill to Communipaw Cove. Cultural remains that have been identified date only from the historic era; historical accounts of aborigines dwelling in the area abound, but site locations are inexact, and, to our knowledge, no remains from the aboriginal cultural period have been recovered in the project area.

The Central Railroad of New Jersey Engine Terminal is located within the project area shown in Figure 7, the composite historical map developed for the 1980 survey (Rutsch and Githens 1980: 22). Analysis of historical maps of the area contributed to the information plotted in Figure 7, on which are shown the probable extent of marsh, dry, and inundated lands at the early Communipaw settlement. The shoreline of historic Communipaw Bay was bordered by extensive marshes, especially along the several streams that drained into the bay. Inasmuch as Communipaw was essentially an extension of higher ground that reached eastward to the bay shore, it was logically used by all cultures as a landing place and entry route into the interior. Extensive marshes to

FIGURE 7. Composite historical map of the Communipaw Bay shoreline and settlement, based on data from maps dated 1764, 1844, 1846, and 1882. (Note: Phillips Drive, or the shoreline on Communipaw Bay, seems to have crept out on made land approximately 100 feet eastward into the bay by the late nineteenth century.) (Rutsch and Githens 1980: 22.)



the south along Communipaw Creek and along the small waterway immediately to its north made Communipaw a convenient peninsula to the shore through the wet bay margin. As is evident from Figure 7, Communipaw developed predominantly near the harbor end of the road inland (Communipaw Avenue) and south of that road along the shore (the route shown as Phillips Drive). It was this settlement area that was investigated in HCI's original study (Rutsch *et al.* 1978A and B).

III. HISTORICAL OVERVIEW OF THE CENTRAL RAILROAD OF NEW JERSEY AT JERSEY CITY

A. BACKGROUND

Chartered in 1831, the Elizabeth and Somerville Railroad Company was the progenitor of the Central Railroad Company of New Jersey, which resulted from a consolidation of the former with the Somerville and Easton Railroad in 1847. This merger was completed in 1848, and the name formally changed in 1849. Its main line from Phillipsburg to Elizabeth was completed in 1852. Extension eastward from Elizabeth to tidewater at Jersey City was via the New Jersey Railroad and Transportation Company's track as per an 1848 agreement.

However, the main terminal at Elizabethport on Newark Bay was too distant from the activity developing around New York Bay. The Jersey Central required a better location for delivering Pennsylvania anthracite and for servicing the predominantly New Jersey commuting clientele that was developing along the company's main line. The Jersey City/Hoboken waterfront was already monopolized by the New Jersey Railroad and Transportation Company (1838) at Exchange Place, the Erie (1861) at Pavonia, and the Delaware, Lackawanna and Western (1862) at Hoboken. All these companies had reached tidewater by extensive and expensive cutting and tunneling through Bergen Hill.

B. 1864 BEGINNINGS

Facing such problems, the Jersey Central secured a charter in 1860 to build a waterfront terminal on New York Harbor. The low mud flats of South (Communipaw) Cove, south of Paulus Hook at the foot of Communipaw Avenue, were chosen as the new site. Instead of bridging the Hackensack and Passaic rivers and then tunneling under Bergen Hill, the Jersey Central chose to bridge Newark Bay to Bayonne, crossing south of Bergen Hill and then following the shoreline of the New York Bay northward to the South Cove. The bridge was a tremendous undertaking, spanning 9,714 feet overall. It consisted of double-tracked timber trestles leaving both shores on either side of a cast- and wrought-iron-trussed swing bridge (Condit 1980: 66).

By contrast, the terminal was a far more modest effort. Placed upon extensive timber pilings that were driven into fill brought in primarily from Manhattan building excavations, the terminal consisted of two structures, both of wooden construction. A train shed received approximately nine tracks west of a head house that appears to have functioned as both concourse and ferry shed. From this point the company operated ferries to Liberty Street in Manhattan. At the time of the erection of the 1889 terminal, this older complex was described as

... some very shabby wooden structures which have been in use ever since the opening of the road to Jersey City in 1864. (*The Railroad Gazette* 1889: 422)

Correspondingly, as Jersey City expanded along with the railroads, its population grew from 6,856 in 1850 to 82,546 in 1870. By the turn of the century this figure stood at 206,433.

C. 1888-89 GRANDEUR

The last decades of the nineteenth century witnessed the rapid rise of New Jersey's suburban towns, a growth spawned by railroad linkage to New York City. A typical example of this phenomenon was the main line of the Jersey Central's service to Elizabeth, Cranford, Plainfield, Bound Brook, Somerville, Whitehouse, Lebanon, Asbury, Bloomsbury, and Phillipsburg. Longer distance service was also available to Easton, Bethlehem, and Allentown in Pennsylvania.

The 1864 facilities quickly became inadequate, and in 1886 planning began for a new terminal. The company chose the prestigious architectural firm of Peabody and Stearns of Boston to design the buildings and give visual clarity to the entire terminal. Peabody and Stearns had already designed Boston's very successful Park Square Station of 1872-74. The architects worked within various eclectic modes but were strongly influenced by Henry Hobson Richardson's work. French Renaissance in its exterior massing and details, internally the Jersey City terminal exhibited the strength of the Romanesque, given a contemporary interpretation with tremendous iron trusses.

Structural design, track planning, and construction were supervised by William H. Peddle, chief engineer for the Jersey Central. The general contractor was V.J. Hedder and Sons of New York, and the fabricator of the ironwork was the Phoenix Iron Company of Phoenixville, Pennsylvania. The largest station project of its time (Condit 1980: 142), it consisted of a ferry shed of four slips, a ferry concourse all on one level, a head house, a train concourse, a train shed, a regraded yard, a new interlocking system and signal tower, and a powerhouse that provided

steam and electricity. The total expenditure for this massive project was \$500,000 (*The Railroad Gazette* 1889: 422). Work was begun in 1887 and completed in 1889. A new Newark Bay bridge was also part of this scheme, similar to the earlier span except that one center moveable portion was a wrought-iron swing bridge (Condit 1980: 66). Carl Condit, in *The Port of New York*, states that

There was abundant evidence that the Central Railroad of New Jersey stood in the front rank of technical innovation in the last decade of the century. (Condit 1980: 147)

In 1891 the Jersey Central ran 266 trains per weekday in and out of its new terminal. Along with its busy passenger service, it operated extensive freight and especially coal float operations south of the Communipaw terminal. Pennsylvania anthracite transversed the bay alongside the passenger ferries. The marine terminal complex represented the greatest concentration of rail facilities in the New York Harbor area at the turn of the century (Condit 1980: 149-50).

D. 1912-14 REMODELING AND EXPANSION

In 1900 the Jersey Central began to expand its South Cove operations by dredging and filling the flats south of its terminal. A bulkhead was established by sinking old canal barges filled with stones. Behind the canal boats an earthen dike was made using fill from cellar excavations (*Engineering News* 1914: 1216). Test excavations in the 1980 HCI survey revealed that a significant amount of domestic garbage and coal cinders were also used as fill (Rutsch and Githens 1980). Eventually, covered freight piers were built out from this new bulkhead.

In New York, the ferry docks of the railroad companies that operated passenger service across the harbor were located south of Christopher Street (except the West Shore Railroad, which ran to 42nd Street). With Manhattan's continued development northward, and in an unusual cooperative venture, the Jersey Central, Erie, and Lackawanna collaborated to build a new ferry terminal at West 23rd Street between 1904 and 1907. Of the essentially six slips that made up adjacent but separate terminals, the Jersey Central operated one, the Erie two, and the Lackawanna three (Droege 1916: 141).

At the same time as the 23rd Street terminal construction, the Jersey Central also extensively altered its Liberty Street passenger and freight terminals. This work was completed between 1905 and 1907. Having established two modernized New York ferry docking facilities at Liberty and 23rd streets by 1907, the Jersey Central's engineering staff turned to the Jersey City terminal site.

By the turn of the century, the company provided 129 ferry boat movements per day each way between Jersey City and Liberty Street and 57 movements per day each way between Jersey City and 23rd Street. Two hundred trains daily entered and left the Jersey City terminal. The total number of passengers using the terminal daily was found by one day's count to be between 27,000 and 28,000 in each direction (*Railway Age Gazette* 1914B: 860). In addition to the Jersey Central trains, which were mostly commuter runs, the Philadelphia and Reading, the Baltimore and Ohio, and, eventually, the Lehigh Valley railroads used these passenger facilities. The Jersey Central decided to enlarge the terminal substantially, reusing the headhouse but erecting new ferry and train sheds and concourses.

In its new plans, the Jersey Central was once again technologically progressive. In 1911 it built a new three-story railway express building along the south side of Johnston Avenue. The building was constructed of trabeated reinforced concrete sheathed with brick. Details of sills, lintels, and copings were also of concrete. The loading bays on the first floor along the street were raised to truck height and led through the building to a railroad siding north of the train shed. The upper two floors were occupied by the railway express offices.

To upgrade its ferry service, the Jersey Central converted its ferries from one to two levels, which required the demolition of the 1889 ferry sheds and concourse and the erection of a new two-story complex. Passenger traffic was thus segregated from vehicular movement. The four slips and the old bridges were retained, but a new concrete and steel structure was built overhead.

The renovation and enlargement of the passenger terminal proper, completed in 1914, greatly eased the handling of people, ferries, and trains. The transition from a gable to a Bush train shed increased the number of passenger trains that could be accommodated and reduced maintenance. The head house was altered to create larger public spaces on either side of a central lobby. Double-story ferry concourses and sheds allowed for segregation of vehicular and pedestrian traffic.

However, these functional advantages came somewhat at the expense of aesthetic considerations. The Peabody and Stearns head house was dominated on the water side by the new two-story ferry house. Although handsomely clad on its New York side, its other, less obvious parts were simply covered by corrugated metal siding. The new ramps, constructed of

reinforced concrete alongside the head house, contrasted harshly with the brick and stone of the nineteenth-century structure. The integrated 1889 terminal had given way to a jumbled assemblage of disparate forms and materials.

Therefore, although the marine terminal complex was improved as a working place by the 1912-14 remodeling, it was somewhat compromised architecturally on the ferry side by those same renovations. The Beaux Arts trend in the City Beautiful movement during the early twentieth century produced great terminals at Hoboken and in New York City--e.g., the Pennsylvania and New York Central terminals. The terminal thus survives as a twentieth-century concept sandwiching a nineteenth-century head house.

E. ADAPTATION

Over the next 15 to 20 years, the Jersey Central transformed the South Cove into a completely modern railroad complex. The freight yards expanded to the south and contained a coal handling facility at Pier 18 (1919; largest in existence at the time) and a dry dock operation for its extensive railroad navy at Pier 19. The passenger terminal yards were enlarged and rearranged. A new signal tower was constructed to house the interlocking machinery in the yards. A yard office tower was erected just west of the signal tower. A power plant, located north of the terminal on Johnston Avenue, was part of the 1914 improvements. On the south side of Johnston Avenue just west of the terminal, were located various storage and repair shops, including a Pullman servicing station.

Also in this post-1914 period was built a modern mail building, just south of the head house. A simple rectangle framed in steel, this building was clad in brick.

In 1914, the Jersey Central constructed a new engine terminal at Communipaw, one mile west of the passenger terminal. The new facilities could handle as many as 300 engines per day and replaced two older such roundhouse facilities at Fiddler's Elbow and Communipaw (*Railway Age Gazette* 1914A: 1585). The 1914 complex at Communipaw consisted of two roundhouses--one with 34 and one with 32 stalls, a powerhouse, a machine shop, a blacksmith shop, a storehouse and office, a material storage building, an oil house, cinder pits, a coaling station, a sand storage facility, a roundhouse office and toilet facilities, engineers' lockers, and a telephone tower. Once again the railroad company utilized the most current construction materials and methods of reinforced concrete. Here, the straightforward new design was aesthetically resolved with brick and glass infill between the concrete structures. This impressive complex of buildings and structures, without which the passenger terminal could not have served its function so well, stands today in a deteriorated, abandoned state, and is the subject of the present recording project.

F. ABANDONMENT

Railroad records for the 1910-20 period clearly show that the era of the American railroad was heading into a long decline. By 1908 the Hudson and Manhattan Railroad had completed the first railroad tunnel under the Hudson River. The Pennsylvania was not far behind with its monumental undertaking of Pennsylvania Station in New York

and its extensive tunnels at Weehawken. By 1920 passenger service was in a decline. After the timely stimulus of World War I and the increased use of automobiles and trucks, personal transit was preferred over mass transit. Serious blows were given to rail/ferry operations by the opening of the great Hudson River vehicular crossings: the Holland and Lincoln tunnels and the George Washington Bridge.

By the late 1960s, the Pennsylvania and New York Central railroads had merged into the Penn Central, and the Erie and Lackawanna had joined forces. The Jersey Central was controlled by the Baltimore and Ohio. Exchange Place, Harsimus Cove, and Pavonia were abandoned and/or demolished. The Aldene Plan of 1967 proposed a major consolidation of passenger railroad facilities in New Jersey. Jersey Central's trains were rerouted to Newark and the Jersey City terminal was abandoned; freight operations continued at Communipaw. The engine terminal was abandoned in 1973.

IV. THE ENGINE TERMINAL AT COMMUNIPAW

A. INTRODUCTION

As discussed in the preceding pages, during the second half of the nineteenth century and the first half of the twentieth, the Central Railroad of New Jersey maintained extensive facilities to service its passenger and freight operations on the New York harbor. Its main line from Phillipsburg crossed the Newark Bay at Elizabethport to Bayonne and followed the western edge of the upper bay to the Jersey City yards. These yards, located on fill in Communipaw Bay as just described, were the most extensive and concentrated such facilities of one railroad company on Jersey City's waterfront. Included here were the large passenger terminal, lightering and car float operations, covered and open piers, the coal dumpers at Pier 18, the marine repair drydocks at Pier 19, and the various support facilities for maintenance of equipment.

As the Hudson County yards at Jersey City and Bayonne became so extensive, the Jersey Central maintained its major classification yards at Elizabethport. In 1901 these yards were expanded, and a large new shop complex was constructed where the Newark and Elizabeth and the mainline branches of the Jersey Central form a "Y." Facilities here included maintenance shops for rolling stock, a machine erecting and boiler shop, a 25-stall roundhouse, and a transfer table.

Complementing these locomotive facilities were older engine terminals at Bayonne and Communipaw. The Bayonne roundhouse was built before 1908 and was demolished before 1928. It was located at the east end of 18th Street and Avenue E just southeast of the East 22nd Street station. Seventeen stalls were contained within a wooden structure having brick end walls.

The 1887 *Atlas of Jersey City, New Jersey*, Plate U, shows a wood frame roundhouse with masonry appendage just west of the passenger terminal (c. 1864). This occurs within the block bounded by Lafayette, Dudley, Maple, and Mason streets. (Dudley and Mason appear to be "paper streets" here.) Another roundhouse segment is shown on Plate V at Johnston Avenue and Washington Street. By the time the *Map Atlas of Hudson County, New Jersey* was published in 1908, a new 20-stall roundhouse appears in the same block location as just described. This facility, just north of the Communipaw Avenue Bridge and Station, was superceded by the subject of this recording project and was demolished sometime before 1919.

As discussed in Section III, D, the 1914 engine terminal at Communipaw, recorded herein, was part of a larger, overall modernization plan enacted by the Central Railroad of New Jersey. This included the passenger and freight terminals and the switching and signalling systems. Locomotives could be fueled and serviced within close proximity to these operations. The engine terminal was the largest and most modern of its type at the time.

The engine facilities there [Communipaw, Jersey City] are probably the busiest in the world, for in prosperous years about 200 locomotives are dispatched from there every 24 hours. (Coupler 1949)

Its layout and technology were most progressive and its architecture equally modern. The eclectic architectural considerations of the great passenger terminal gave way to a functional aesthetic marked by modern materials and methods. This occurrence was concurrent with revolutionary experiments of modernism in Western Europe. Especially notable at Communipaw is the extensive use of reinforced concrete structural systems.

B. PROCESS DESCRIPTION

To maintain their locomotives which made runs to the Jersey City passenger and freight terminals, the Central Railroad of New Jersey built a first-class engine terminal in 1914. This consisted of fueling stations, two turntables and segmental roundhouses, a powerhouse, storage areas, and major repair shops. Logically the site for these facilities was due west of the grand passenger terminal at the foot of Johnston Avenue in Jersey City, at the point where the main line approach tracks to the terminal swing eastward and parallel the roadway of Johnston Avenue. At this point as well, the northern track of the freight yard forms a "Y" with the main line (see Figure 8). The site is on the opposite side of the main line from the old Communipaw roundhouse, which stood for some years after the new terminal was built (see Figure 8). Standing on the northeast corner of the intersection of Communipaw Avenue and Phillips Street, the most modern engine terminal of any railroad before World War I must have offered a striking contrast to the early houses on the opposite side of the street.

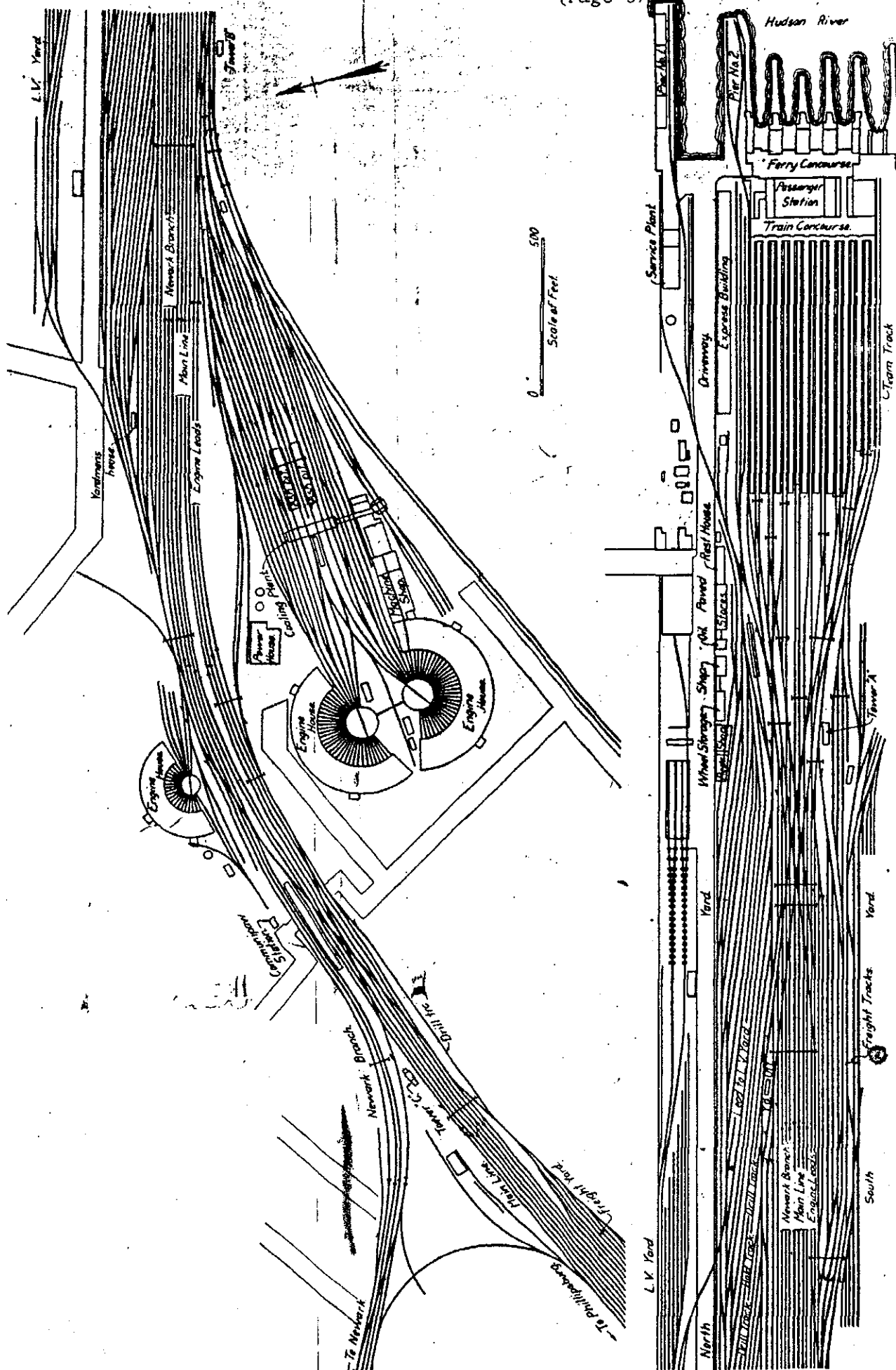


FIGURE 8. The revised track layout of the Central Railroad of New Jersey, between the Jersey City Terminal and Communipaw (*Railway Age Gazette* 1915: 788).

The new engine terminal provided space for the storage and minor repair and maintenance of locomotives. Two roundhouse segments and separate turntables were designed to segregate engine service of the freight and passenger lines, obviously providing a versatility lacking in most engine terminals. The two segments contained 32 and 34 stalls for a total capacity of 66 engines. Here locomotives could undergo light repairs, be housed when out of use, and be cleaned after runs. Construction of the terminal facilities was carried out under the direction of Joseph O. Osgood, chief engineer, and A.E. Owen, principal assistant engineer of the Central Railroad of New Jersey.

For major repairs to locomotives, a machine shop and blacksmith shop were annexed to the 34-stall roundhouse. From stall No. 2 of this segment, a locomotive could pass through the roundhouse to the monitor-roofed machine shop (see Figure 8). Housed here were small lathes, crank planers, and other such machines. A fire wall and a pair of doors separated this space from the blacksmith shop beyond, which housed forges, steam hammers, cranes, punches and shears, hand bending rolls, and screw flanges (see Figure 9; see also Figure 15).

Attached to the blacksmith shop was the major parts storage building and related office. An open material platform beyond this area separated the shop and storage building from the oil house; it was always desirable to store the volatile fuels distant from the locomotives. The oil house was merely a small one-story building which straddled the oil pits below ground. Freestanding oil tanks on concrete and timber cradles were also located beyond the house itself (see Figure 9; see also Figure 15).

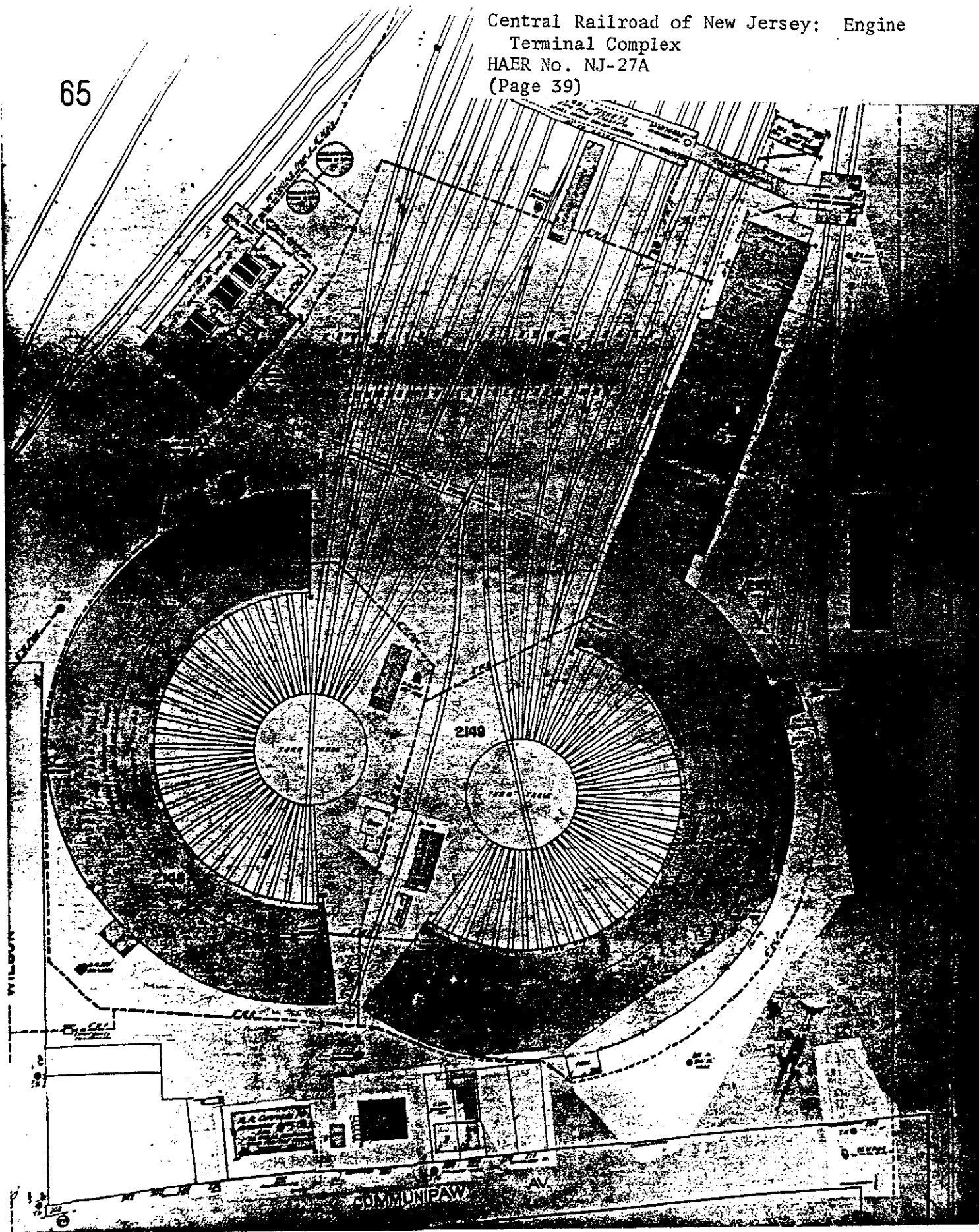


FIGURE 9. Sanborn Insurance Company map of the CRRNJ Engine Terminal (1914 insertion into 1911 map book, updated to 1950).

The main fueling station at the engine terminal was a tremendous coaling plant located across the approach tracks east of the two round-houses (shown on Figures 8, 9, and 15). It spanned 8 tracks and served an additional track at each end. Coal was brought to two receiving hoppers south of the material platform. From these hoppers coal was discharged by means of reciprocating feeders into bucket-conveying elevators over the material platform and southern tracks of the engine terminal yard. The conveying elevators took the coal to the top of the hopper house, where it was discharged on conveyor belts running up the conveyor bridge over the top of the bunkers. Traveling trippers running on rails above the bunkers discharged coal into the various compartments. (At the time of this recording, the hopper house and conveyor bridge had been removed; therefore, see Figures 8 and 9 for maps of these features and Figures 11, 13, and 16 for photographs of them).

East of the coaling plant were two submerged cinder pits (labeled "ash pits" in Figure 8), each served by two tracks. Cinders were cleared out of the pits by an electric traveling crane that had a clam shell bucket. (This feature had been completely removed at the time of this recording; its location is indicated in Figure 9, over the unlabeled pits, which are indicated by dashed lines. See also Figures 15 and 17.) North of the coaling plant was located wheel-truing machinery, which straddled concrete foundations. (Only the foundations were extant at the time of this recording.)

West of the coaling plant, and actually an integral part of that facility, was the sand house (drawn, but unlabeled, in Figure 8; labeled "sand dryers" in Figure 9). Here sand was stored and dried by means of two coal stoves. It was then screened and elevated by compressed air

to two storage tanks of 15-cubic yard capacity located on the west side of the coaling plant. From these tanks the sand was delivered to the locomotives by cast-iron pipes and wrought-iron telescoping spouts at each of the ten tracks.

A diesel oil fueling station was added to the engine terminal sometime after 1914 (for location, see Figure 9). This facility was located south of the machine shop/blacksmith shop. The station included two freestanding fuel tanks and an adjacent building containing an oil room, an oil pump room, lockers, and offices. (At the time of this recording, this diesel locomotive servicing facility had been removed.)

A large powerhouse provided electricity not only for the engine terminal but also for all rail requirements between Jersey City and the Newark Bay (see Figures 8 and 9). Six boilers of 250 horsepower each and three 600-kilowatt, 2,200-volt a.c. generators were based here. The boilers were fabricated by Babcock & Wilcox, the generators were General Electric units, and the other electrical equipment was designed and executed by Westinghouse Church Kerr & Company of New York City (*Railway Age Gazette* 1914A: 1,587). Two 2,500-cubic foot steam air compressors furnished air for the engine terminal and for the operation of signals and switches between this location and the passenger terminal and Newark and Elizabethport on the Newark branch.

Adjacent to the powerhouse were two 100,000-gallon water tanks (mapped in Figures 8 and 9). Water was taken from a 16-inch city water main and discharged through altitude valves into the tanks. It then passed through the low or service system of piping to eight water columns in the yard for filling engine tanks and for general use in the terminal buildings. In addition, a high pressure system was carried around

the property and into the various buildings from the fire pump in the powerhouse for fire protection. The tanks were scrapped before this recording was accomplished, leaving only the footings. Historical photographs (Figures 11, 12, and 18) show these two tanks.

In the space between the two roundhouses were located office and toilet facilities for the workers as well as tool storage and a fuel oil pit (see Figure 9). These were support structures for the activity within the roundhouses and the terminal yard.

After 1928 the Central Railroad of New Jersey constructed ancillary facilities along Communipaw Avenue to support this substantial engine terminal operation. A large three-story building at 232 Communipaw was constructed to house the railroad company's offices and the engineers' bunks. A one-story railroad restaurant was also built at 230 Communipaw. Between these two buildings was a small one-story office. At the time of this recording, these three buildings were no longer extant (see Figure 9 for their location). Figure 10 is a schematic drawing of the various processes accomplished at the Communipaw terminal. It is designed to illustrate how the elements of this complex functioned and interrelated.

C. ARCHITECTURAL DESCRIPTION

If the development of modern architecture in the early twentieth century was fostered by the new functional requirements of society, especially industry and the corresponding building material expansion, then the Jersey Central Engine Terminal combines both of these stimuli in its modernistic expression. The architectural exuberances of the later years of the nineteenth century gave way to simple, functionally articulated masses simply adorned with wide horizontal bands on brick and concrete.

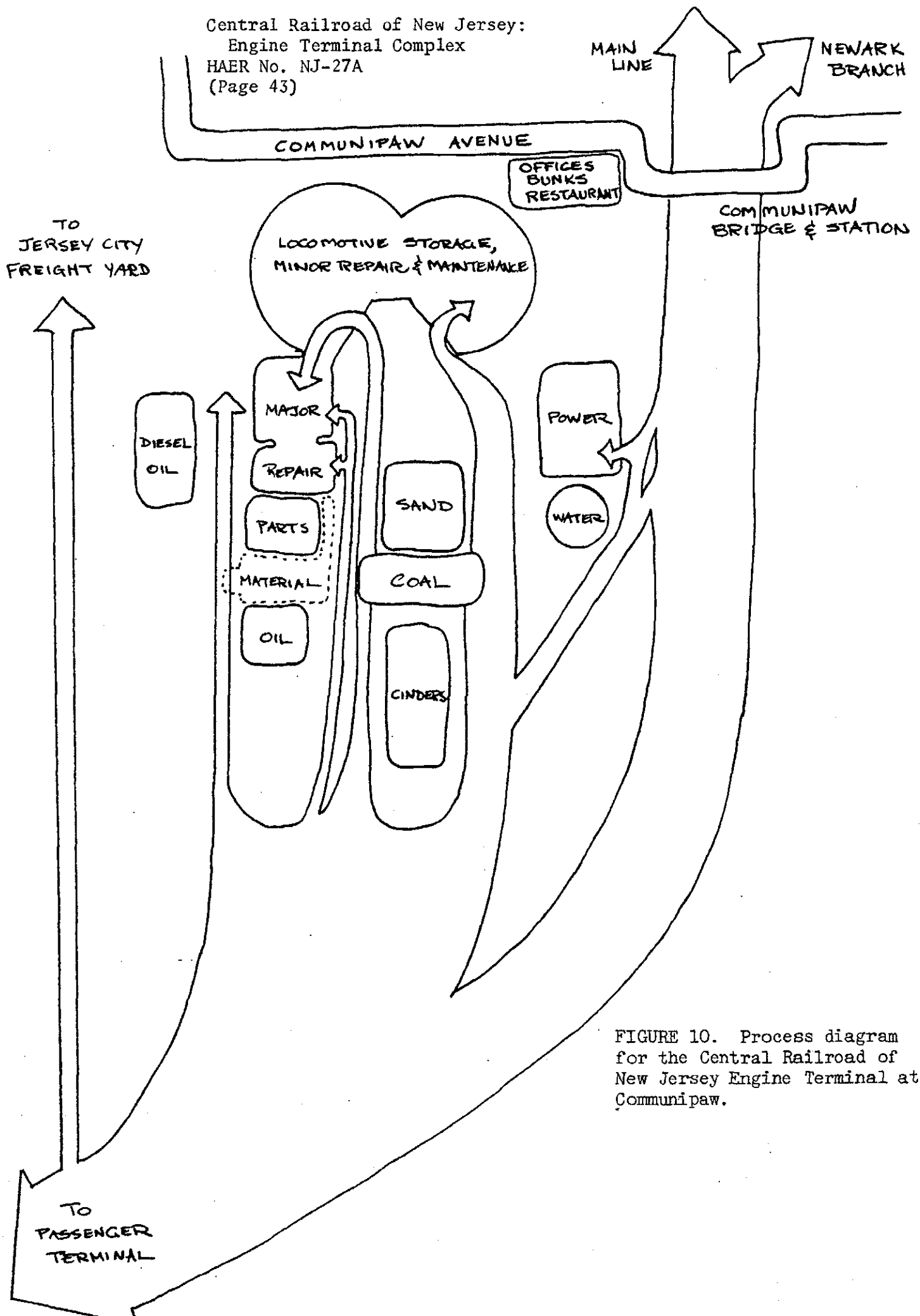


FIGURE 10. Process diagram for the Central Railroad of New Jersey Engine Terminal at Communipaw.

Reinforced concrete and steel gave the railroad buildings the fireproof quality that had only been experimental in the previous century. Whereas the concrete and steel of the remodeled passenger terminal at Jersey City was clad with Beaux Arts designed metal, the engine terminal, a completely new construction, embraced the aesthetic of functionalism with articulated structure and minimal ornamental detail.

The forms of the complex were dominated by the low, broad segmental circles of the two roundhouses, the hulking, stilled form of the coaling station, and the huge powerhouse and its tall steel stack (see Photographs 1 and 2). From historical views the two steel water tanks to the east of the powerhouse were also prominent images, although removed before the time of this present recording (see Figures 11 and 12).

The two roundhouse segments were of identical form and section. The north roundhouse of 32 stalls (numbers 35 through 66) was freestanding, whereas the 34-stall south roundhouse (stalls 1 through 34) was connected to the machine and blacksmith shops via the additional two bays. The north roundhouse can best be characterized as a half-circle where tracks 35 and 66 are in the same line. The end walls, however, are tilted inward from one another toward the center line of the turntable. The 32 stalls in the north roundhouse are 90 feet long; the 34 stalls of the south roundhouse are 100 feet long. The geometry of the latter makes it slightly larger (by two stalls) than a half-circle, and stall tracks 3 and 34 are in the same line. Track 2 leads through doors and fire walls to the machine and blacksmith shops. Track 1 stub-ends at the machine shop/engine house common wall. Both roundhouses were served by 100-foot-diameter turntables.

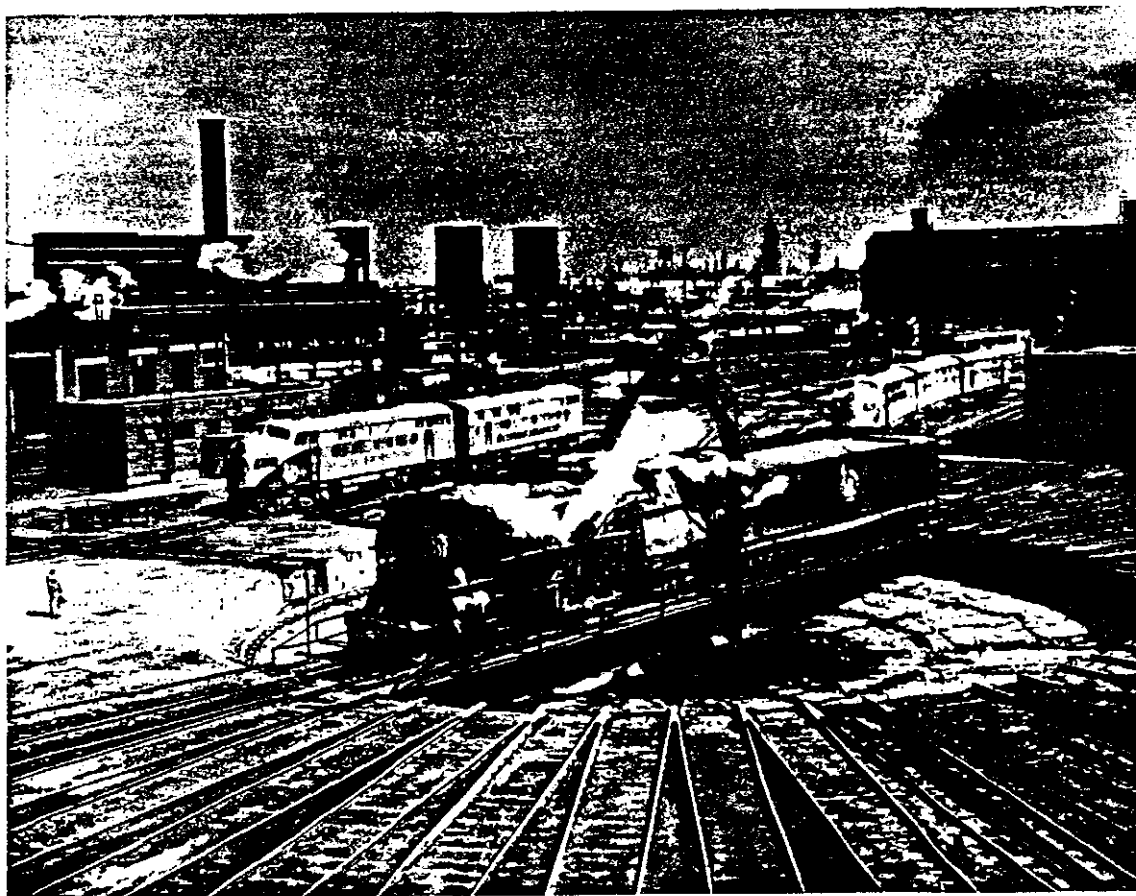


FIGURE 11. Undated view toward the northeast of the south turntable. The powerhouse and its two adjacent water towers appear in the left background. In the right background the northern portion of the coaling plant is visible behind the end of the south roundhouse. (Photograph courtesy of the Jersey City Public Library, the New Jersey Room Collection; copied by Michael Spozarsky, 1981.)

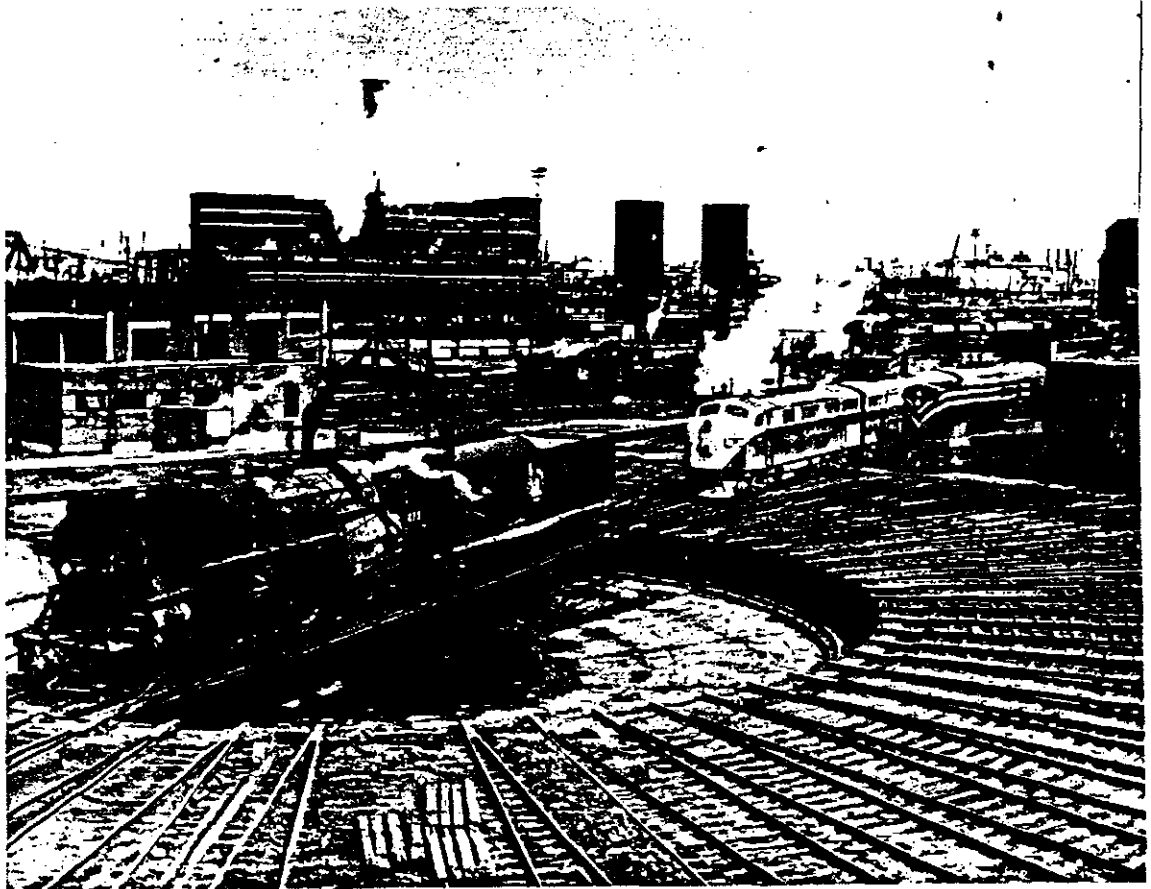


FIGURE 12. View toward the north of the south turntable. Engine 875 is on the deck. The powerhouse and water tanks are in the center and left background. The south wall, east end of the north roundhouse is visible behind the office building at the left. (Photograph courtesy of the Jersey City Public Library, the New Jersey Room Collection; copied by Michael Spozarsky, 1981.)
Undated.

Both roundhouses were partially demolished apparently at the time of the construction of the Hudson County Extension of the New Jersey Turnpike. The north roundhouse lost its center portion (stalls 44-57). Western and eastern segments remain, stalls 35 through 43 and 58 through 66 respectively. These were converted to warehouse space. The west end of the south roundhouse was also removed (stalls 25 through 34), yielding a 24-stall roundhouse still connected to the machine and blacksmith shops.

Note: Because the north roundhouse was cut in two, this recording treats the two segments as separate buildings. They are referred to herein as the eastern and western segments of the north roundhouse.

The roundhouses were constructed of steel reinforced concrete structural members. Infill and end walls were of brick and steel sashed curtain walls. Although the middle portion of the north roundhouse was removed, the two south-facing end walls survive. The original end wall of the western segment (see Photograph 3) of this building contains four bays, reflecting the lines of columns in the interior. The red brick walling of running bond (5 stretcher courses) is capped by a concrete coping on top of the parapet. The openings are spanned by reinforced concrete lintels and sills. The slopes of the end walls reflect the two slopes of roof that create a clerestory over the first inner line of columns. From the outer wall, the wall tilts upward and over three bays to this clerestory; then the slope reverses downward over the fourth bay to the inner wall (see Photograph 3). The first bay--that closest to the outer wall--is actually two openings: a lower, ground level aperture is a doorway leading to the floor of the roundhouse;

above it is a 4-foot high window. Upon conversion to warehousing facilities, the windows of this segment were sealed with cinder and concrete blocks.

Looking from the position of the turntable at the inner walls of the two segments of the north roundhouse, the viewer sees the engine bays. These were approximately 15 feet from centerline to centerline of the reinforced concrete columns (see Photographs 4 and 5). The outer wall piers were approximately 24 feet center to center (see Photograph 6). Two fan blower sheds were attached to the outside of each roundhouse (see Photographs 6 and 7).

Inspection of the reinforced concrete structural system (see Photographs 8 and 9) shows the two-way girder system employed and supported by the reinforced columns. Radiating girders defined each stall and intersected the inner circle of girders. The concrete roofing sat on a reinforced hollow tile deck which formed the plastering surface for the ceiling below. These views of the north roundhouse segments show the end wall condition created by the removal of the center portion of this building.

Only the concrete foundations of the south roundhouse turntable survive (see Photograph 10). Each engine house was served by a 100-foot in diameter deck turntable. Each was composed of steel plate girders that rotated about a pivot point (see Figures 11 through 14). An outer rail allowed the ends of the turntable to rotate; an electrified rail provided the necessary power.

The outer wall of the south roundhouse survives relatively intact (see Photograph 11). Here the curtain wall spanning the structural piers is extant. The low brick wall rises to a concrete sill. The header of

each window bay is actually the outer span of girder across the opening from pier to pier. The inner bays (see Photograph 12) also contain the original paneled doors of each stall.

Outside stall No. 10 and near the fan blower shed attached to the south roundhouse is a small iron-reinforced brick oven (see Photograph 13). Located near the diesel locomotive servicing facility (since demolished), it was probably used to heat metal to forging temperature so that it could be shaped or forge welded in engine repair work.

As seen from the interior view of the south roundhouse (see Photograph 14), each bay is defined by a row of columns and an open pit with a rail on either side. Cut into the plate at the top of each step leading down to the pit are the words "SAFETY ALWAYS." The difference in roof heights across the first line of columns creates the clerestory effect for admitting natural light to the interior. Although electric lighting was provided throughout, the engine houses reflect the traditional concern for daylight.

Each chamfered square concrete column has a steel collar to protect its lower section (see Photograph 15). Where the columns receive the girders, flared capitals make the structural connection. Just inside the outer row of freestanding columns are the smoke jacks over each bay. These asbestos drums permitted the gases of the engines to escape directly to the outside. Additional ventilation was provided at the outside wall, where hollow tiles located in the wall near the ceiling allowed air to pass through the open cores to the outside. Severe moisture problems had caused the plastered ceiling of the south



FIGURE 13. View toward the east. South turntable is in the foreground, with Engine 875 on its deck. The north portion of the south roundhouse is visible from center to far right, and the coaling plant with its coal conveyor appears in the background (upper left). (Photograph courtesy of the Jersey City Public Library, the New Jersey Room Collection; copied by Michael Spozarsky, 1981.) Undated.

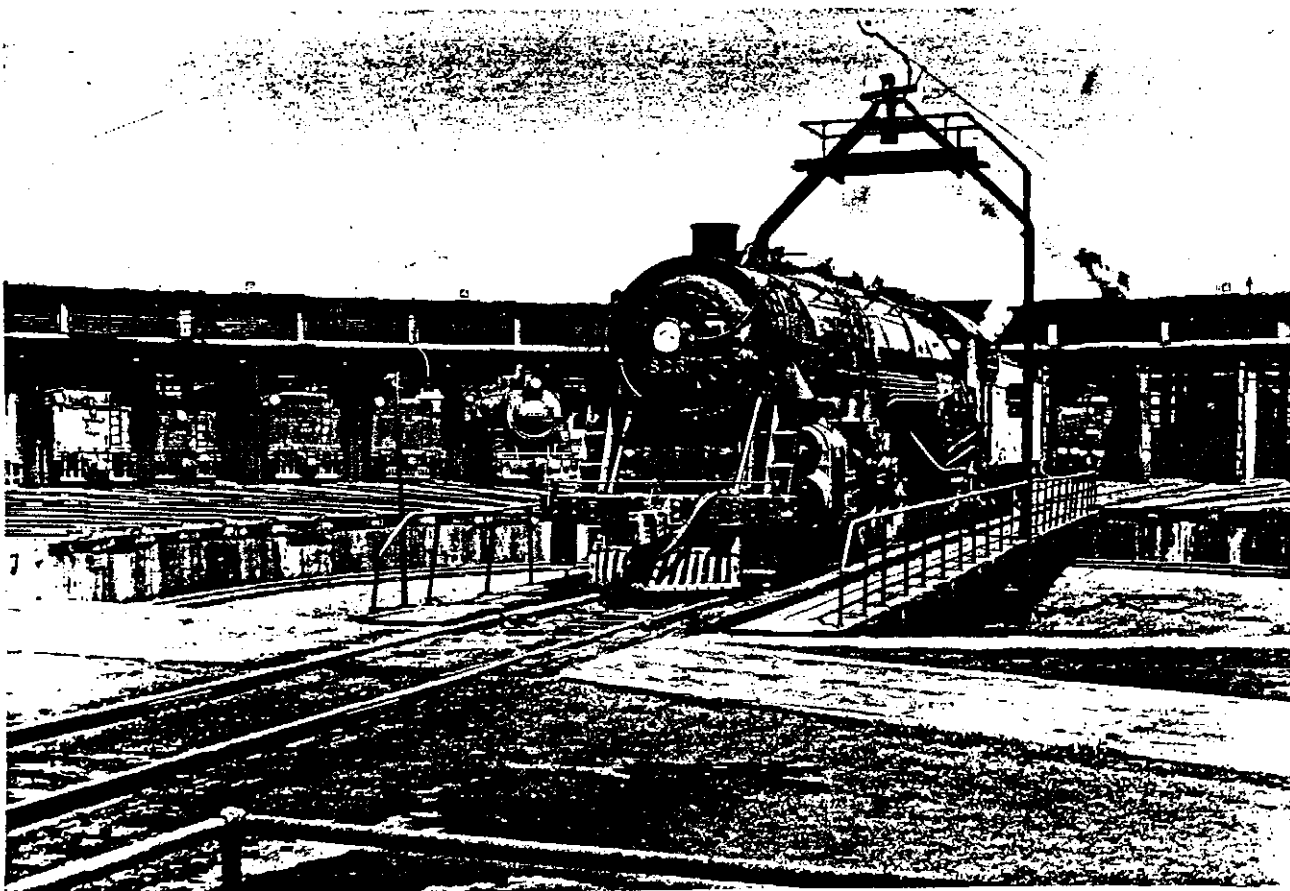


FIGURE 14. View toward the northwest at Engine 823 on the north turntable. The north roundhouse is visible in the background. (Photograph courtesy of the Jersey City Public Library, the New Jersey Room Collection; copied by Michael Spozarsky, 1981.) Undated.

roundhouse to deteriorate to the point where the reinforced hollow tile roof system was exposed; in some places, even the reinforcing itself was open to the elements. Each bay can be said to be typical with the exception of stalls 1 and 2 in the south roundhouse. Just inside the entry doors of these two stalls and situated between the two tracks is a heavy duty pivoting crane (see Photograph 16). This crane could swing out over the coal tenders of each engine and facilitate their repair or maintenance. Two-level working platforms are located on each side of the end of stall 1 (see Photograph 17). These steel structures, made up of stairs, pipe rails, and fancifully cut openings in the webs of the structural members, made the various levels of each locomotive accessible to the workmen. Track 2 could also be serviced by the platform between it and track 1. However track 2 was especially important because it led directly, via a pair of doors, to the machine shop, east of the south roundhouse (see Photographs 8 and 19). These two structures shared a common party wall (see Figure 15). In the southwest corner of the machine shop building was located a small 24-by-24-foot room that served as the workers' washroom (see Photograph 20). It contained showers, sinks, and lockers. Access was given from both the machine shop and the south roundhouse at the end of stall 3. The space was spanned by simple steel beams which carried the reinforced hollow tile and concrete roof. A slightly off-center skylight gave natural illumination to the space from above; windows raised high on the south wall also admitted daylight. The walls were of brick, the floor of concrete, and the gang sinks and shower stalls of terrazzo.

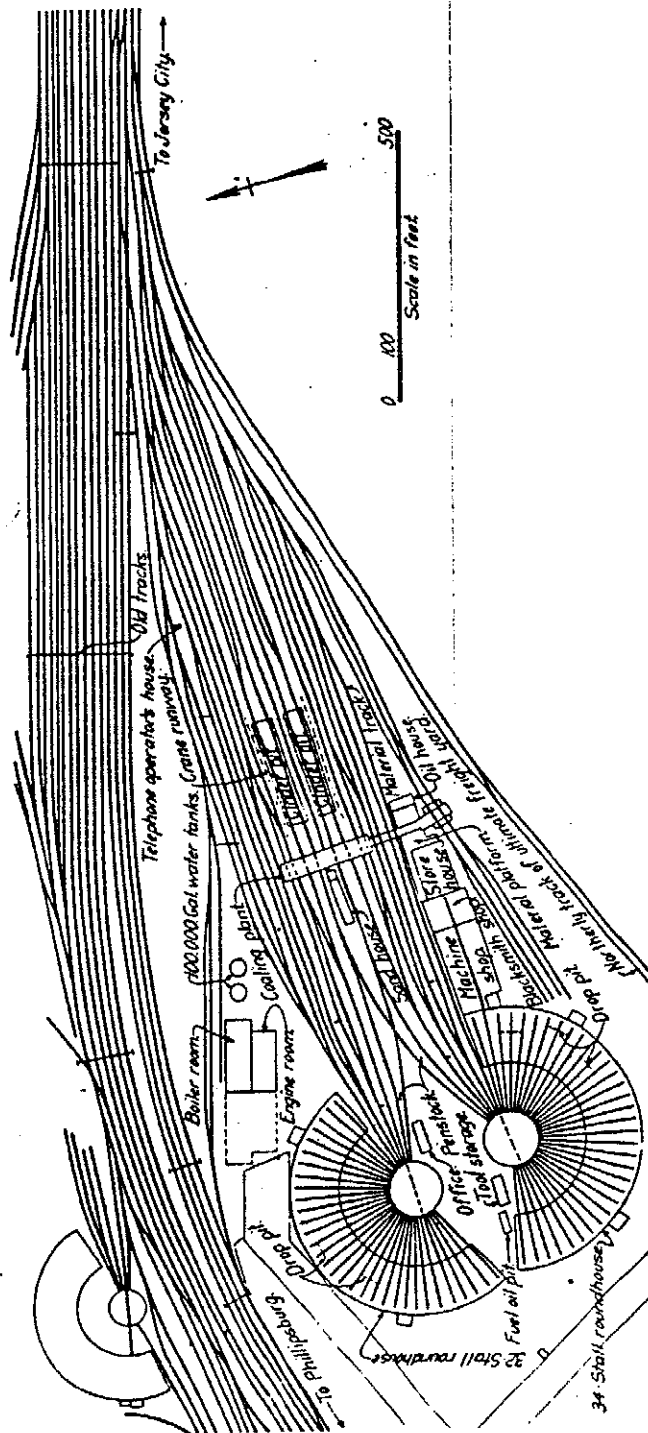


FIGURE 15. Plan showing buildings and tracks at CRNJ Engine Terminal at Communipaw (Railway Age Gazette 1914A: 1,585). (Compare with Figures 8 and 9.)

The shop building embraced both machining and blacksmithing operations under the same roof; only a fire wall separated them. The shop was a simple rectangle measuring 80 feet wide by 220 feet long by 28 feet high. The machine shop takes up the western 160 feet of this length, and the blacksmith shop the eastern 60 feet. This length is organized into 11 window bays: 8 in the machine shop and 3 in the blacksmith shop. Down the center of the space is a 13-foot wide monitor that is a continuous external form but is divided internally by the fire wall separating the two shops (see Photographs 21 and 22). The roof deck is carried by purlins that sit atop simple Pratt trusses which transverse the opening from side wall to side wall. The trusses are composed of 12 panels and are built up from wide flange, channel, and angle sections. All connections are riveted. Truss locations correspond to the 11 bays presented on the side walls.

The well-lit spaces can be attributed to the monitor roof and the tremendous window openings of the side wall bays. A concrete foundation receives only 14 courses of brick and is then capped by a concrete sill. The entire area from this sill to the ceiling is filled with steel sash. Doorway access for the loading and unloading of material to the shops is provided for on both sides.

All the apparatus from the machine shop had been removed by the time of this recording. Only the two steel working platforms that flank the center line track were extant (see Photograph 22). The blacksmith shop equipment had also been removed. All the forges were gone, but some of the cranes that served them were extant. One is a freestanding pivoting steel structure affixed to the underside of the

first truss east of the fire wall (see Photograph 23), which connects to the machine shop here via a pair of sliding fire doors. The other surviving crane is wall hung, mounted on the east wall of the blacksmith shop (see Photograph 24). At the middle bay of the north wall is a door that opened onto the material track in the yard. A ramp in the northeast corner of the blacksmith shop led, via sliding fire doors, to the open material platform beyond the east wall of the shop (see Photograph 25).

East of the shops was located the storeroom (see Figures 9 and 15), where parts were stored. An office was located at its eastern end. This rectangular, low, one-story brick building measures 60 by 100 feet and has a corbelled cornice and concrete coping, lintels, and sills. It is organized into seven bays on the south side (see Photograph 25); the eastern 20 feet of the length served as the office. Inside, the reinforced concrete structural system was concealed in the layout of the parts bins (see Photograph 26).

A concrete material platform separated the storehouse from the freestanding oil house, a small (20- by 48-foot) brick building straddling a 10-foot deep basement storage tank for oil (see Photograph 27). The oil house contained the metering apparatus for the lubricants. Its openings are spanned by concrete sills and lintels. Its brick walling sits on a concrete foundation and is highlighted only by corbeled courses just above the lintel line. East of the oil house are a number of concrete and wooden foundations for metal drums, no doubt scrapped and removed before this recording.

South of the shops and south roundhouse was located a diesel locomotive servicing facility, which consisted of two tanks (which are barely visible at far right behind the roundhouse in Figure 13) and a one-story concrete block structure that measured 32 by 120 feet (see Figure 9). The building was located west of the diesel fueling tanks and contained offices, an oil room, a pump room, and lockers. Neither the building nor the tanks were standing at the time of this recording.

The massive coaling station of reinforced concrete still stands on the site (see Photograph 28). It serviced ten tracks, five on each side of the center. Each set of five was composed of two single-track bays toward the middle, one double-bay track toward the outside, and one track running along each edge. The structure measures 168 by 34 feet and is 55 feet high. The bunkers sit on steel "I" beams encased in concrete; hollow tile and reinforced concrete compose the bottom of the hoppers. The continuous monitor is composed of steel trusses with a stucco skin. The monitor form was carried in the conveyor bridge which transferred coal to the hopper house, located southeast of the material platform (see Figure 16). The bunkers were grouped in four compartments of three, each longitudinally having bituminous coal, broken coal, and buckwheat coal. These had capacities of 430, 813, and 430 tons, respectively. Each track had three chutes each (see Photograph 29). All apparatus in the coaling station was electrically driven.

The coaling station worked in concert with the sand distribution system. An engine took on clean, dry sand to sprinkle on the tracks ahead of it to improve traction. The sand house was a one-story rectangular building 103 feet long by 16 feet wide and 14 feet high (see Photograph 28). In it, sand was stored, dried by coal stoves, screened,

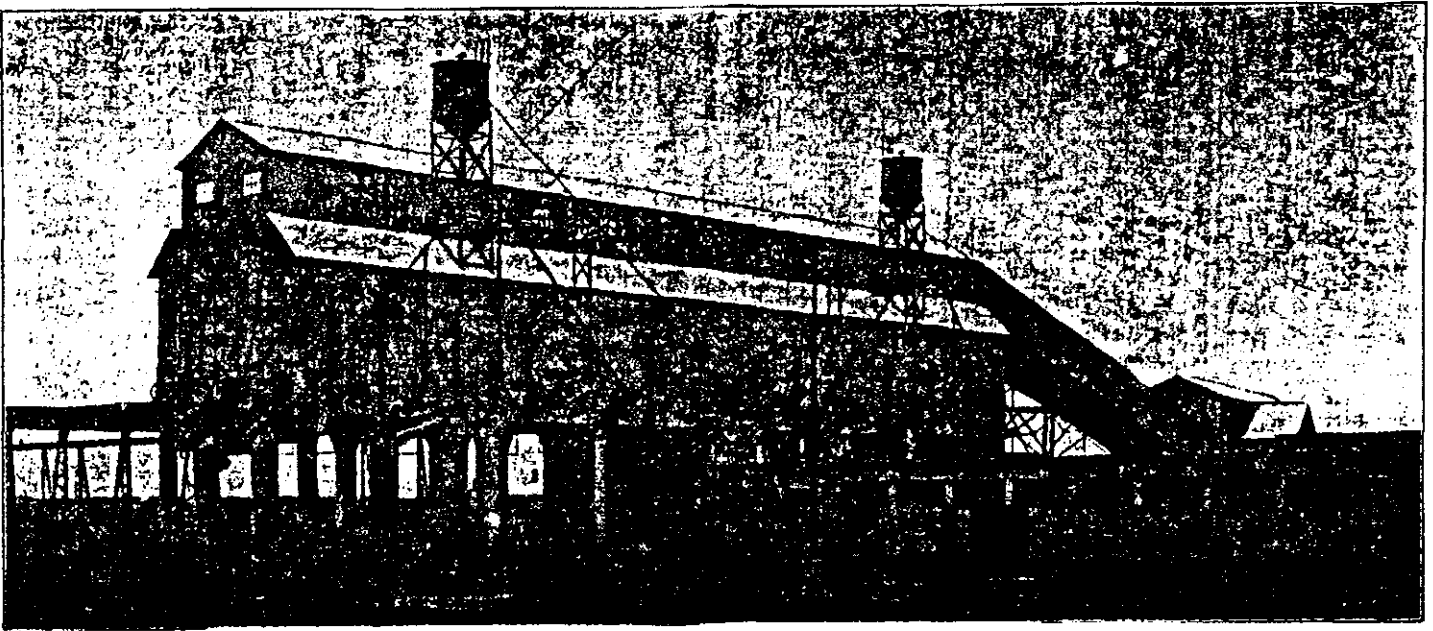


FIGURE 16. Reinforced concrete coaling station and sandhouse
(right foreground) serving engines on ten tracks (*Railway Age
Gazette* 1914A: 1,586).

and then elevated by means of compressed air to two 15-cubic yard storage tanks, which were located on the west side of the coaling station (see Photograph 30). From these tanks, cast-iron piping and wrought-iron spouts delivered the sand to the locomotives at each of ten coaling stations (see Photograph 31).

The wheel-truing machinery was located north of the coaling station. Only the concrete foundations of this apparatus were extant at the time of this recording (see Photograph 32).

East of the coaling station were located two cinder pits (see Figures 15 and 17). They measured 200 feet long by 30 feet wide by 12 feet deep and were constructed of reinforced concrete. Each pit served two tracks. The pits were 58 feet center to center, with a track between for cinder cars. A traveling crane with bucket cleaned the pits. It spanned 99 feet and traveled on a 240-foot long runway 26 feet above the rail.

Northwest of the coaling station and situated at the end of Wilson Street was the huge power plant that supplied the engine terminal with electricity and steam (see Figures 9 and 15). The building consisted of a two-story portion to the north side (see Photograph 33), where the boilers were housed and where coal was hoisted in a tower structure, and a one-story portion to the south, where the generators were situated (see Photograph 34). The 75-foot high lined steel stack was 10 feet 6 inches in diameter and provided a draft by automatically controlled blowers.

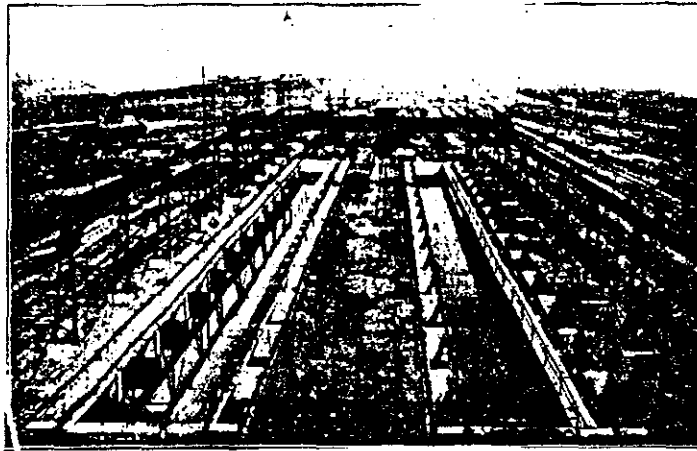


FIGURE 17. The two submerged cinder pits with traveling crane for loading ashes into cars on center track (*Railway Age Gazette* 1914A: 1,587).

The rectangular floor plan of the powerhouse measures 135 feet long by 92 feet wide. All foundations for the building proper and for the boilers and machinery are of concrete. The building has a steel structural frame clad with the typical brick walling relieved by concrete sills, lintels, and copings. The mass of the brick walling is relieved by horizontal string courses of concrete. Above the first floor level and wrapping around the entire building is a concrete cornice, with a brick parapet above it on the lower section. The one-story portion on the south side is organized into nine bays filled with steel sash between piers of brick.

A supply track for coal cars was located along the north side of the powerhouse near the main line. Cars were placed below the hoistway and coal elevated to the bunkers on the second floor, from whence it was gravity fed to the boilers below. Photograph 33 shows the angle north of the powerhouse at which the elevated New Jersey Turnpike Hudson County Extension and the National Docks Railroad bridges crossed the Jersey Central main line.

East of the powerhouse were located two 100,000-gallon water tanks, which were scrapped before the time of this recording (see Figures 9 and 15). These tanks are visible in Figures 11 and 12. They were steel tanks and standpipes supported on four legs. Only the foundations of these structures remain (see Photograph 35).

Within the yard area between the two roundhouse segments were located support buildings and structures for the engine terminal operations. South of the east end of the north roundhouse was located a one-story office

building (see Photograph 36). Its rectangular plan measured 60 feet by 20 feet. Typical brick walling was relieved by concrete sills and coping on the parapet. Here, however, the lintels were steel with a continuous brick soldier course wrapping around the building at this level. The entire building sat on a concrete foundation and had a concrete floor.

A similar building for tool storage purposes was located southwest of this yard office (see Photograph 37). All architectural features here were identical to the office building just described. The tool storage building was a rectangle measuring 20 by 54 feet.

The yard was also electrically illuminated. One tower containing an observation platform and floodlights was extant at the time of the recording (see Photograph 37), and it provided a convenient perch for photographing the engine terminal complex.

West of the tool storage building was a fuel oil pit (see Figures 9 and 15), of which only the concrete foundations were standing at the time of this recording (see Photograph 38).

After 1928 the Jersey Central erected three support buildings on Communipaw Avenue just south of the bridge over its main line tracks. These were a three-story railroad office and engineers' bunk house, a one-story office, and a one-story restaurant (see Figure 9). These were removed before the time of this recording.

The three-story office building, visible on the horizon at the extreme left of the photograph in Figure 18, followed the architectural precedents of the terminal structures. Brick walling was relieved by concrete lintels, sills, etc. All floors were of reinforced concrete

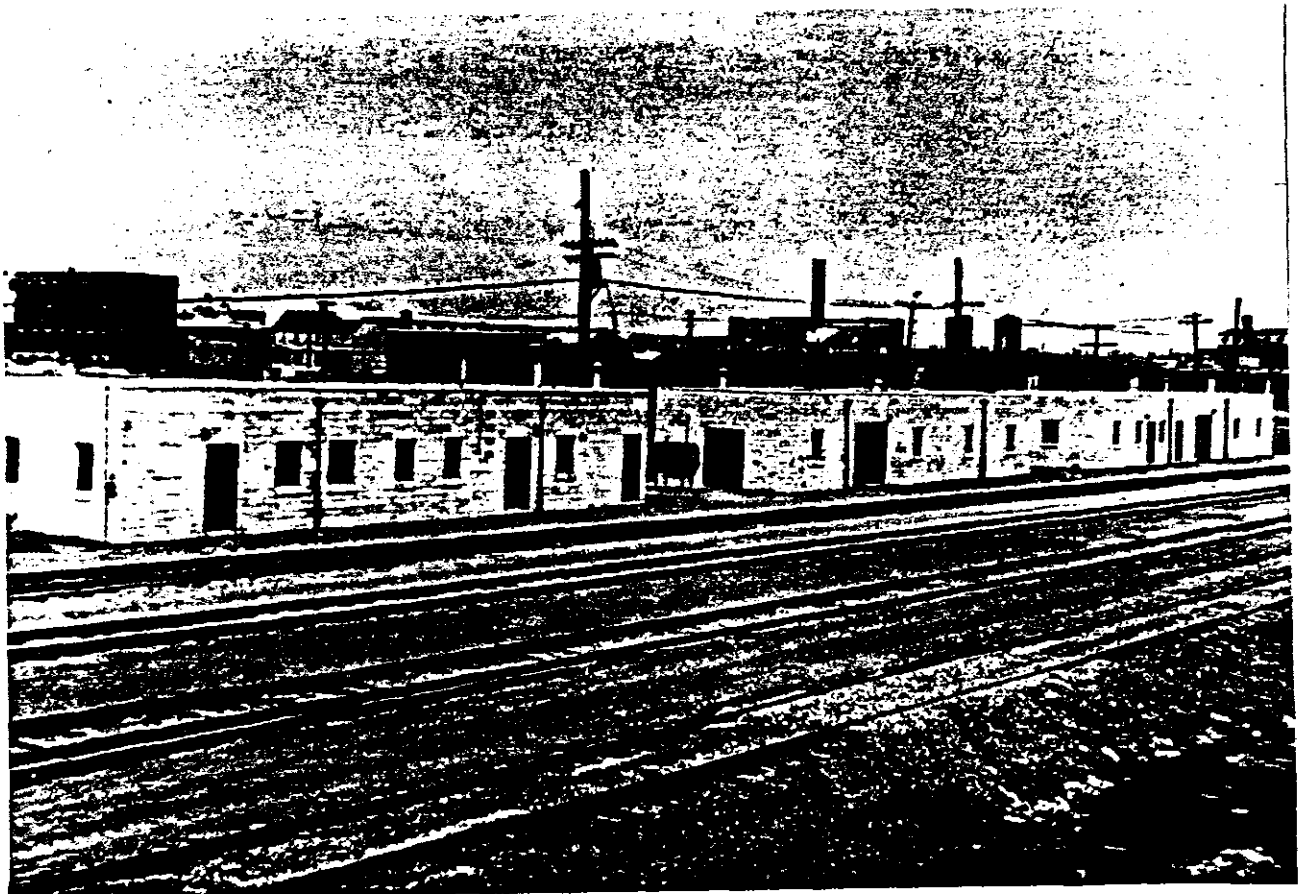


FIGURE 18. Undated view toward the north at the engine terminal complex. The one-story probable warehouse buildings in the center were located on the south side of Phillips Drive just west of Communipaw Avenue. The photograph is included because it shows the three-story office on Communipaw Avenue (on horizon, far left). (Photograph courtesy of the Jersey City Public Library, the New Jersey Room Collection; copied by Michael Spozarsky.)

construction with tile partitions and a wooden roof. The rectangular plan measured approximately 70 feet by 32 feet (dimensions taken from Sanborn map, Figure 9).

The tiny 20 by 12-foot adjacent one-story office structure was similarly constructed of brick and concrete with a wooden roof. The 36 by 40-foot restaurant, however, was listed on the Sanborn map as being of concrete block.

V. BIBLIOGRAPHY

Bergen and Jersey City

- 1910 The Free Public Library of Jersey City, Jersey City, N.J.

Brett, Rev. Cornelius, D.D.

- 1908 The Dutch Settlement in Hudson County. *Historical Society of Hudson County Bulletin*, No. 1 of papers.

Condit, Carl W.

- 1980 *The Port of New York*. The University of Chicago Press, Chicago.

Coupler

- 1949 Historical Highlights--The Central Railroad of New Jersey. Special supplement. April.

Cunningham, John T.

- 1966 *New Jersey: America's Main Road*. Doubleday & Co., Inc., Garden City, New York.

Droege, John A.

- 1916 *Passenger Terminals and Trains*. McGraw-Hill Book Company, Inc., New York.

Eaton, Harriet Phillips

- 1899 *Jersey City and Its Historic Sites*. Woman's Club of Jersey City, N.J.

Engineering News

- 1914 Methods of Filling and Dredging for a Jersey City Terminal. Vol. 72, No. 25, pp. 1216-18.

HCI

- 1977 *Cultural Resources Reconnaissance, Liberty State Park*. Cultural resources survey report prepared for the N.J. Department of Environmental Protection and Geddes Brecher Qualls Cunningham, Princeton, N.J., by Historic Conservation and Interpretation, Inc., of Newton, N.J.

Hopkins' Plat Book of Hudson County, N.J.

1928 Vol. 1, Jersey City. G.M. Hopkins & Co., Philadelphia.

Lane, W. J.

1939 *From Indian Trail to Iron Horse.* Princeton University Press,
Princeton, N.J.

Mangin, Joseph F.

1804 *A Map of That Part of the Town of Jersey Commonly Called
Powles Hook.*

Map Atlas of Hudson County, N.J.

1908 G.M. Hopkins & Co., Philadelphia.

Map of New York Bay & Harbor and the Environs

1846 C. & G.S. No. 37, Sheet 5 of 6.

Railway Age Gazette

1914A Jersey Central Engine Terminal at Communipaw. Vol. 56, No.
26, pp. 1585-87. New York.

1914B The Jersey City Passenger Station Improvements. Vol. 57,
No. 19, pp. 860-64. New York.

1915 Reconstruction of the Jersey City Terminal Yards. Vol. 58, No.
15, pp. 787-91. New York.

Rutsch, Edward S., and Herbert J. Githens

1980 *Stage IB Cultural Resources Survey of the Hudson County
Sewerage Authority's Proposed Sewerage Treatment Facilities
at the Jersey City East Treatment Plant, Jersey City, Hudson
County, N.J.* Report prepared for Havens and Emerson, Inc.,
Saddle Brook, N.J. and Hazen and Sawyer, Inc., New York, N.Y.
by Historic Conservation and Interpretation, Inc., Newton, N.J.

Rutsch, Edward S., Michael N. Gimigliano, Ralph J. Leo, Jr., and
Brian H. Morrell

1978A *Stage IA Cultural Resource Survey for the Hudson County
Sewerage Authority 201 Wastewater Facility Plan--District I,
Jersey City, North Bergen, Secaucus, and Kearny. Appendix C:
Cultural Resources--Social and Physical Context.* Report
prepared for Havens and Emerson, Inc., Saddle Brook, N.J. and
Hazen and Sawyer, Inc., New York, in Association, by
Historic Conservation and Interpretation, Inc., Newton, N.J.
March.

Rutsch, Edward S., Michael N. Gimigliano, Ralph J. Leo, Jr., and
Brian H. Morrell

- 1978B *Stage IA Cultural Resource Survey for the Hudson County
Sewerage Authority 201 Wastewater Facility Plan--District I,
Jersey City, North Bergen, Secaucus, and Kearny. Appendix
D: Cultural Resources--Survey of Designated Corridors.*
Report prepared for Havens and Emerson, Inc., Saddle Brook,
N.J. and Hazen and Sawyer, Inc., New York, in Association,
by Historic Conservation and Interpretation, Inc., Newton,
N.J. April

Sanborn Map

- 1911 Sanborn Insurance Company, New York. Plate 62, showing the
complex and copied in Figure 9, was inserted in 1914. The
entire volume was "corrected" (updated) to 1950.

Sanford, Cynthia H., and Eileen M. McMahon

- 1976 *August Will: Scenes of Old Jersey City.* Catalog for an
exhibit between Oct. 5 and Dec. 30. Jersey City Library
Museum, Jersey City, N.J.

Shaw, William

- 1884 *History of Essex and Hudson Counties, New Jersey,* Vol. 2.
Philadelphia.

Staten Island Magazine

- 1888 Our Neighbor... Old Communipaw. Vol. 1, No. 2, pp. 100-103.

Stevens, Frank

- 1910 *Jersey City of To-Day: Its History, People, Trades, Commerce,
Institutions & Industry.* Frank Stevens, Publisher, Jersey
City, N.J.

The Railroad Gazette

- 1889 New Station and Interlocking at the Jersey City Terminus
of the Central Railroad of New Jersey. Vol. 21, June 28,
pp. 422-23. New York.

Van Winkle, Daniel

- 1902 *Old Bergen, History and Reminiscences* John W. Harrison,
Jersey City, N.J.

Westgard, A.L.

- 1905 *Atlas of the State of New Jersey.* Survey Map Co., New York,
p. 17.

Winfield, Charles H.

- 1872 *History of the Land Titles in Hudson County, N.J., 1609-1871,*
 Vols. 1 and 2. Wynkoop & Hallenback, New York.
- 1874 *History of the County of Hudson, New Jersey.* Kennard and
 Hay, New York.
1891. *A Monograph on the Founding of Jersey City.* The Caxton Press,
 New York.

VI. ADDENDUM: CONSTRUCTION DRAWINGS

Upon the completion of this report it was discovered that construction drawings existed for the engine terminal complex. The firm responsible for the design of the engine terminal at Communipaw was Westinghouse, Church, Kerr and Company of New York. This engineering concern was the consultant for the entire electrification of the Long Island Railroad between 1903 and 1905 (Condit 1980: 319). The firm was also responsible for the engineering design and supervision of excavation, concrete work, tunnels, tracks, foundations, drainage, electrical conduits, mechanical and electrical equipment, service buildings and steel erection for Pennsylvania Station in New York City, 1904-1910 (Condit 1980: 389-90).

Upon completion of this report, it was discovered that the actual working drawings for the 1913-1914 construction as prepared by Westinghouse, Church, Kerr and Company were available for examination. These documents were mylar copies of the originals which were maintained by the Central Railroad of New Jersey and are presently in the possession of Wyre Dick and Company of Livingston, New Jersey. The sheets vary greatly in size and quality. Although the set was not complete, Herbert J. Githens examined a total of 105 drawing sheets, a list of which is given on the following pages.

Reproduction of all these documents was not necessary for the purposes of this report; not only would it not be a complete set, but, in addition, most of the information would be superfluous. The drawings were therefore examined to determine how these additional images could enhance the record of this place where historical or contemporary photographs were not effective. Images from eight sheets were selected for reproduction and are included herein as Photographs 39-46.

The hopper house and conveyor bridge of the coaling station, for example, were demolished before this photographic recording was undertaken. The drawings from sheets 2042-E-28 and 2042-F-279 clarify these structures (see Photographs 39 and 40, respectively). Only the concrete foundation of the fuel oil pit survived to be photographed (Photograph 38), but sheet 2042-E-166 (Photograph 41) provides the missing images for the report. The same is true of the cinder pits. A historical photograph was provided (Figure 17) from *Railway Age Gazette*. This image is enhanced by the section of the pits taken from sheet 2042-F-15 (Photograph 42). A very clear picture of a typical roundhouse bay is offered in sheet 2042-F-17 (Photograph 43), which shows a plan and section from the 34-stall 100-foot roundhouse. Descriptive building sections are provided for the blacksmith shop, sheet 2042-F-5 (Photograph 44), and for the Power Plant. For the latter, sheets 2042-F-23 (Photograph 45) and 2042-F-163 (Photograph 46) show the building construction and the apparatus within. Dangerous conditions in this building combined with difficult lighting problems had prevented a photographic record. Here, in the drawings, the information is clear and orderly.

LIST OF DRAWING SHEETS EXAMINED

<u>SHEET No.</u>	<u>SHEET TITLE</u>
2042-F-169	Coaling Station, West Elevation
-F-297	90 ft. Roundhouse Plans, Sections & Elevations of Easterly Fan House & Pump Room
NN*	100 ft. Roundhouse, General Plan
-F-250	Arrangement of Air Piping and Detail of After-Cooler
-F-154	Power House, Basement Floor Plan
-F-158	Power House, North Elevation
-F-163**	Power House, Longitudinal Section, C-C through Boiler Room
-F-58	90 Ft. Roundhouse Service Piping
-E-237	Drainage System for Plumbing and Leaders
-E-28**	Arrangement of Coaling Station
-E-63	100 ft. Turntable Pit Details
-E-378	Engineers' Tool Storage Bldg.--Plan, Section, & Elevations
-E-111	Oil House, Direct Heating System
-e-248	Oil House, Equipment and Piping
-E-166**	Detail of Fuel Oil Pit
-E-66	Oil House: Plans, Section, Elevations
-F-12	90 ft. Roundhouse, Indirect Heating System, Detail of Fan Room
-E-380	Engineers' Tool Storage Bldg., Direct Heating System
-F-279**	Coaling Station Conveyor Tower and Housing over Track Pit, Sections and Elevations
-F-82	90 ft. Roundhouse Lighting
-F-309	Coaling Station, Lighting and Power Circuits
-E-289	Coaling Station, Belt Conveyor Bridge Loading & Strains for Trusses
-C-228	Coaling Station, Erection Diagram Bottom of Coal Bin
-F-84	Yard Lighting

* No Number Given

** Images from these eight sheets were selected for reproduction
and are included herein as Photographs 39-46.

LIST OF DRAWING SHEETS EXAMINED, continued

<u>SHEET No.</u>	<u>SHEET TITLE</u>
2042-E-387	Coaling Station, Detail of Tripper Chute
-E-307	Coaling Station, Typical Details of Studding
-D-373	Fire Cleaners and Hostlers Toilet and Locker Room, Direct Heating System
-F-178	Service Piping in Yard and Tunnel
-F-305	Winters Gravity System, Locomotive Boiler Washing Plant (this is water tank located northeast of 90-ft. or 32-stall roundhouse)
-F-162	Power House Cross Sections, A-A & B-B
-F-162	Power House, Longitudinal Section D-D through Turbine Room
-F-160	Power House, East Elevation & Ash Bin Sections
-F-170	Coaling Station, Longitudinal Section
-F-19	100 Foot Roundhouse, Plan, Section, Elevation of Fan Rooms
-F-17**	100 Foot Roundhouse, Plan and Section of Typical Bay
NN	Plan of Drainage System
-H-8	90 Foot Roundhouse, General Plan
-F-22	General Arrangement of Power Plant, Basement Floor Plan
-F-44	Storehouse, North & East Elevations, Sections A-A, B-B
-F-15**	Cinder Pits
-F-167	Coaling Station, End Elevations, Cross Sections
-F-168	Coaling Station, Plan at Top & Bottom of Bin
-F-23**	General Arrangement of Power Plant Sections
-F-88	Power House, Boiler & Turbine Room Floors, Steel Framing Plans
-F-9	90 ft. Roundhouse Plan, Section of One Bay, Details
-G-46	Location Plan of Water & Fire Protection Pipe Lines
-F-103	Power House, Detail of Self-Supporting Steel Stack for Natural Draft
-F-40	90 ft. Roundhouse, End and Bay Elevations
-F-161	Power House, West Elevation
NN	100 ft. Roundhouse, End and Bay Elevations
-F-5**	Machine & Blacksmith Shop Plan, Elevations & Sections

LIST OF DRAWING SHEETS EXAMINED, continued

<u>SHEET No.</u>	<u>SHEET TITLE</u>
2042-F-10	90 ft. Roundhouse Plan, Section & Elevations of Fan Room
-D-286	Roundhouse Foreman's Office and Toilet, Direct Heating System
-E-283	Coaling Station Arrangement of Cast-Iron Sand Piping Gates and Spouts
-E-321	Detail of Sand Hopper
-F-249	Coaling Station Arrangement & Details, W.I. Sand Piping
-F-263	Coaling Station Belt Conveyor Bridge
-D-229	Power House, Main Switchboard
-E-356	Machine Shop, Arrangement of Shafting for Driving Machine Tools
-E-78	Machine and Blacksmith Shop Lighting
-E-62	100 Foot Roundhouse, Detail of Door to Machine Shop
-F-157	Power House Plan at Elevation 61'-0" Coal Bin Roof
-E-306	Power House Conduit Layout
-F-217	Coaling Station, General Arrangement of Coaling Gates Showing Location of Bolts
-F-272	Power House Air Piping
-F-159	Power House, South Elevations
-F-43	Storehouse, Floor Plan & South Elevation
-F-313	Power House Lighting Plans
-F-314	Power House Lighting Section
-F-274	Power House Basement Lighting
-F-348	Power House, Assembly of 2300-Volt Switching Structure and Transformer Wiring
-G-254	Power House Steam and Exhaust Piping, Sections A-A, B-B, C-C, D-D, and E-E
-G-270	Power House, Boiler Feed Piping
NN	Power House, Steam and Exhaust Piping Plan and Sections C-C & F-F
-D-243	Plumbing for Power House Toilets
-F-76	100 ft. Roundhouse Lighting
-E-239	Plumbing for Machine Shop and Blacksmith Shop Toilet
-E-311	Machine Shop Service Piping
-E-328	Arrangement of Wiring in Pipe Tunnel

LIST OF DRAWING SHEETS EXAMINED, continued

<u>SHEET No.</u>	<u>SHEET TITLE</u>
2042-F-184	Machine Shop, Blacksmith Shop, Storehouse Direct Heating System
-F-280	Coaling Station, Conveyor Tower and Housing over Track Pit, Steel Framing Plans
-F-155	Power House, Main Floor Plan
-F-6	Cinder Pits and Crane Runway
-F-59	100 ft. Roundhouse Service Piping
-F-332	Power House, Low Pressure Drip Piping
-F-151	Power House, Coal Chute and Spreader
-E-24	General Arrangement of Power Plant Coal & Ash Handling
-F-104	Power House, Detail of Steel Flue and Damper
-F-141	Power House, Detail of Boiler Setting
-F-102	Power House, Detail of Brick and Tile Flue
-F-94	Power House, Blow-Off Piping
-F-271	Power House, Service Water Piping
-F-173	Power House, Detail of Ash Chute
-E-25	General Arrangement of Power Plant Piping Diagrams
-F-361	Power House, Ash Hoist
-F-21	General Arrangement of Power Plant Main Floor Plan
-F-38	Details of Special Hardware for 90 & 100 ft. Roundhouses
-F-27	90 & 100 Foot Roundhouse Door Details
-F-77	Storehouse Lighting
-F-30	100 Ft. Roundhouse Indirect Heating System Detail of Fan Rooms
-D-288	Coaling Station Conveyor Tower and Housing over Track Pit Loading and Strains for Trusses
-D-241	Plumbing for Roundhouse Toilet
-D-114	Roundhouse Office and Toilet Building Lighting
-E-242	Plumbing for Storehouse Toilet
-F-189	Powerhouse Details of Supports over Bin for Coal Handling Machinery